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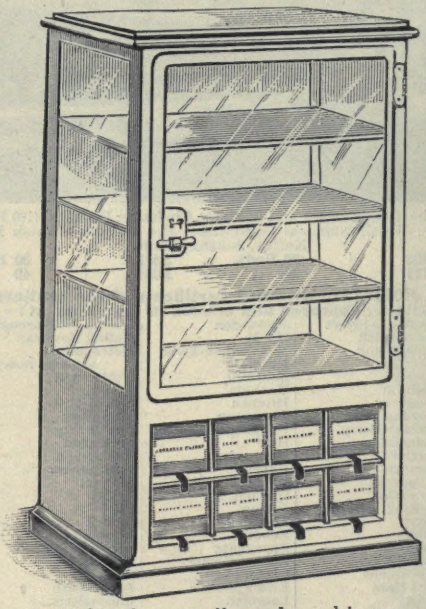

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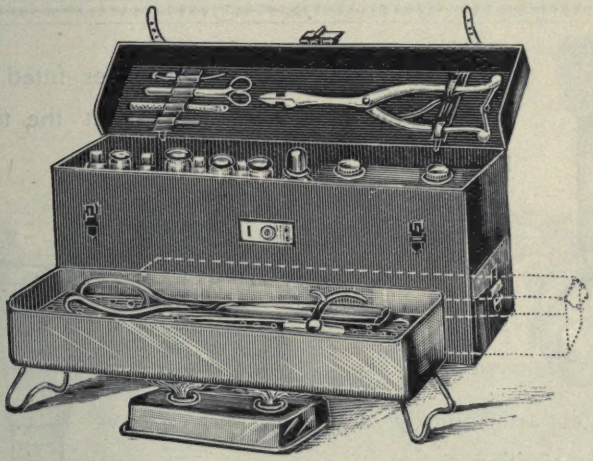

The bag is made of cowhide (either black or brown) and has a compartment beneath into which the Sterilizer fits.

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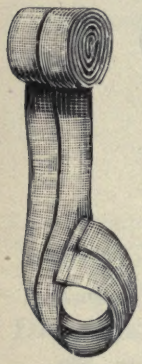

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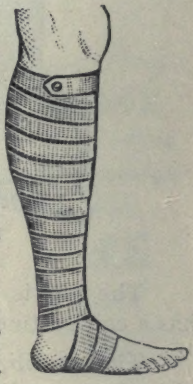

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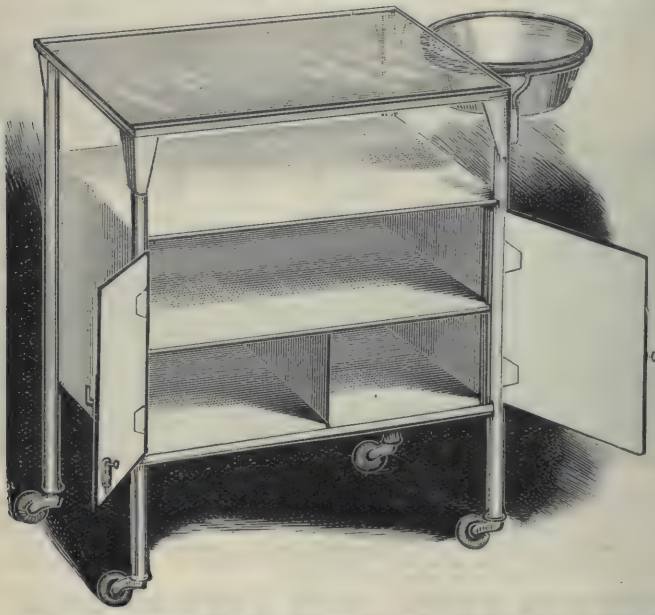

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Fig. 1.

APRONS, as suggested and worn by Mr. THELWALL THOMAS, of Liverpool.

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In White Drill, 5/- each.

Measurements required—

Circumference at chest, and length desired.

Fig. 1.

Fig. 2.

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Fig. 2.

Fig. 3.

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Fig. 3.

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To prevent steam getting into the room, attach a piece of rubber tubing to the outlet **C**, and carry it into a basin of water.

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Fig. II.—STERILIZING BOX.

Fig. III.

- **A** Sterilizing Box.
- **C** Outlet for steam.
- **D** Channels showing how steam ascends, passing into holes in the box, through the Dressings, and out of bottom of box at **E**, escaping at **C**.
- **H** Lid to Sterilizer.
- **K** Screw clamp.
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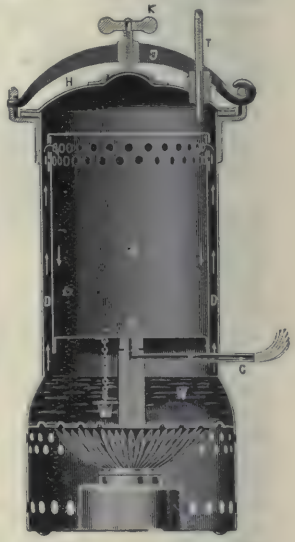

Fig. III.—SECTION SHOWING BOX IN SITU, ETC.

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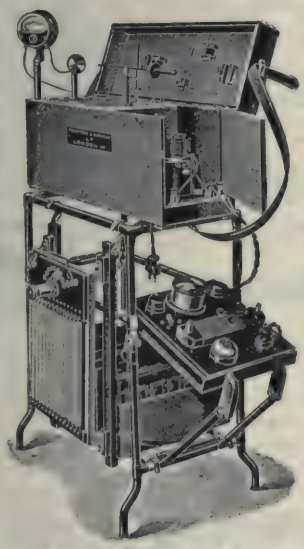

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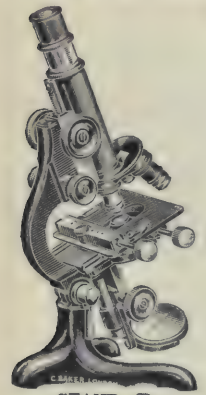

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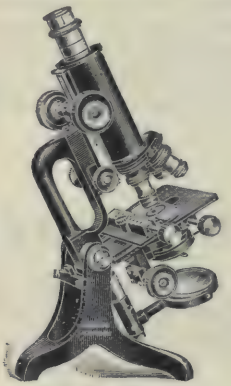

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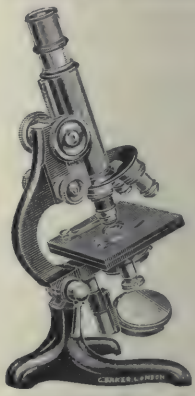

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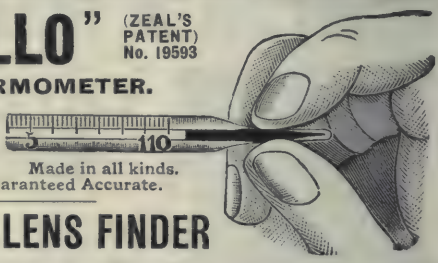

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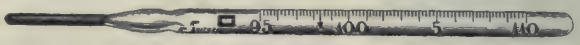

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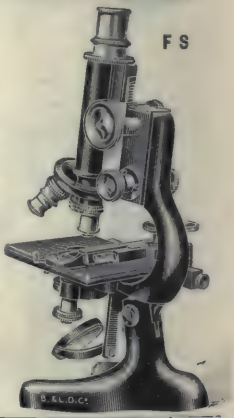

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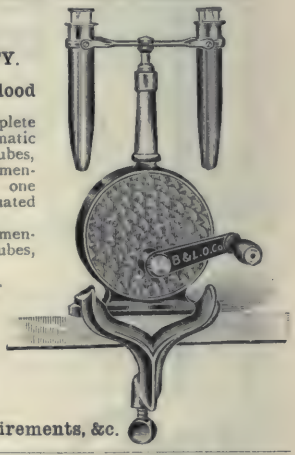

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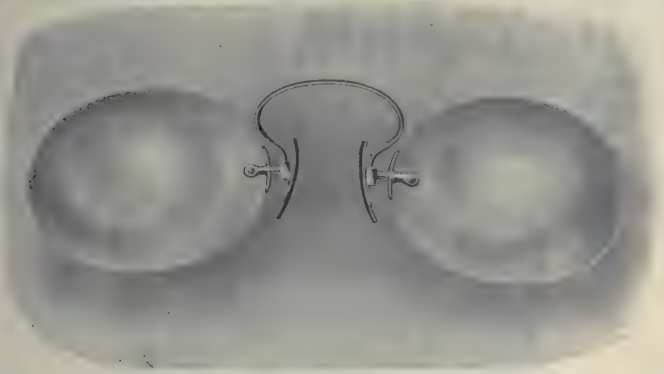

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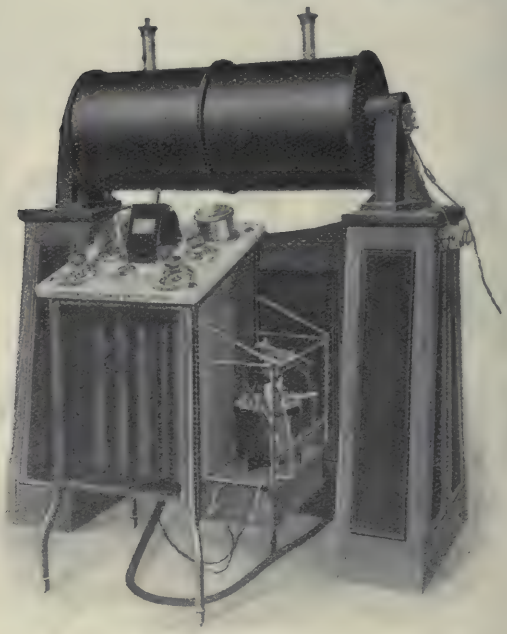

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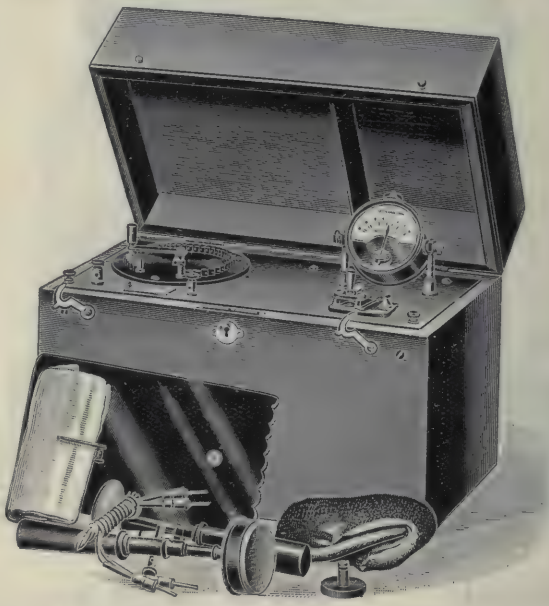

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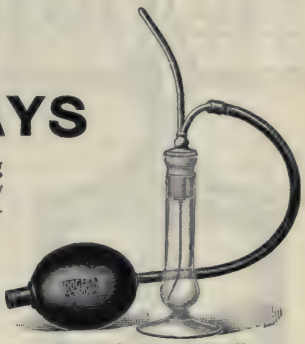

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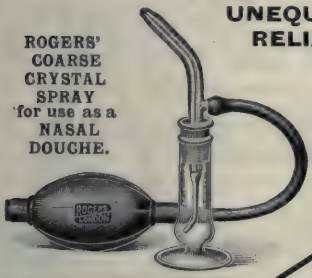

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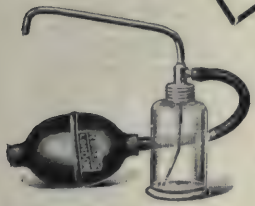

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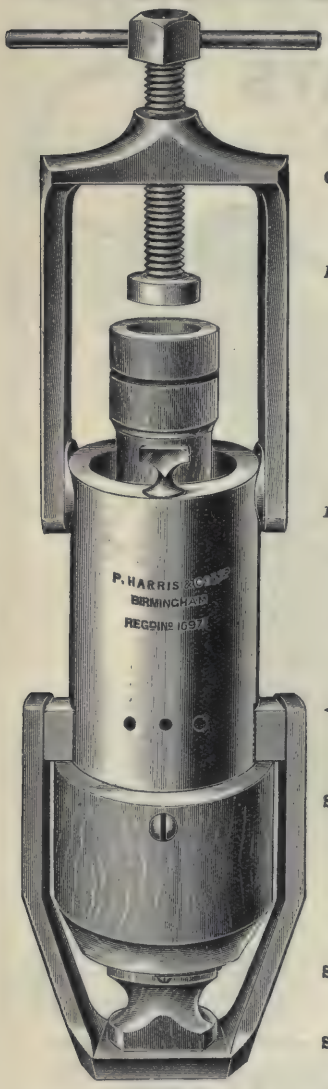

Fig. 7.

The "Hall-Edwards" Carbon Dioxide Snow Collector and Compressor.

Apparatus for Collecting and Applying Carbon Dioxide Snow.

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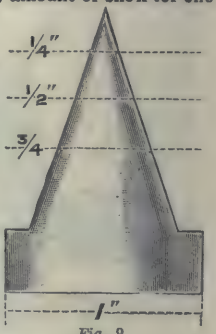

Fig. 9.

Fig. 9.—**Diagram of Compressed Snow,** showing broad base and cone-shaped projection. The transverse lines indicate the positions for cutting off the cone so as to produce a circle of any desired diameter.

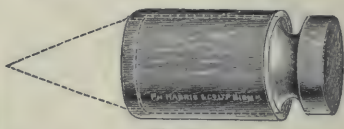

Fig. 10.

Fig. 10.—The applicator showing cone of compressed snow projecting from its lower end.

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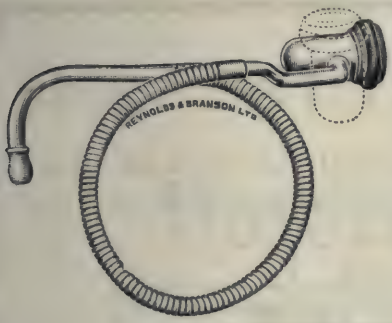

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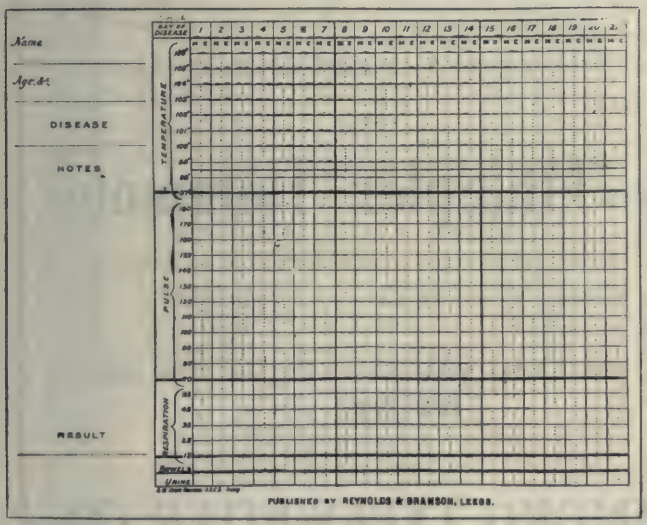

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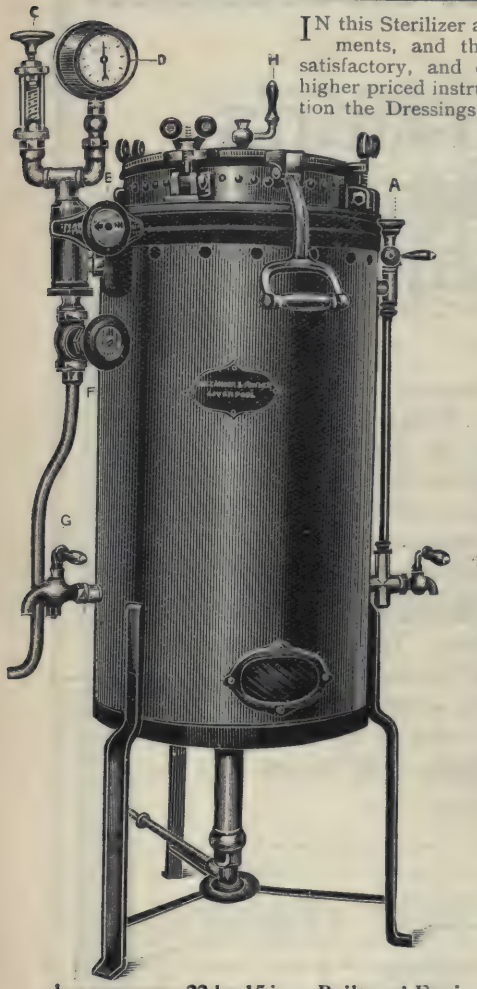

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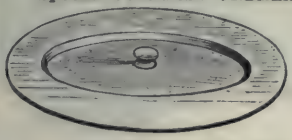

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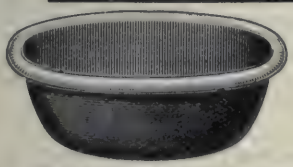

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Hunterian Professor, Royal College of Surgeons; Examiner in Physiology for the F.R.C.S.; Hon. Asst. Surg. Bristol Royal Infirmary; Senr. Demonstrator of Physiology, Univ. of Bristol.

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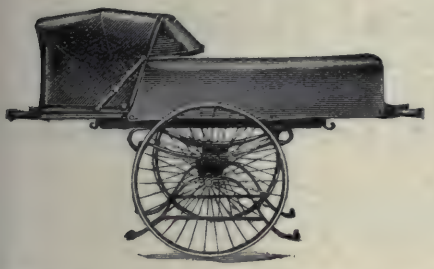

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Fig. 130.—COMPRESSION OF SUBCLAVIAN WITH BOTH THUMBS.

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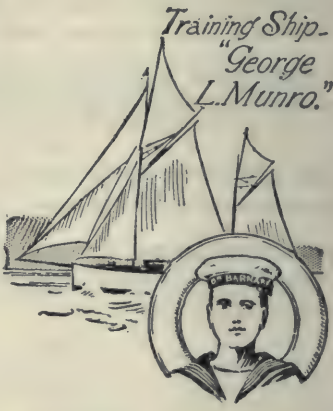

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PREFACE

Apart from the special articles on Naval and Military Surgery, and references to personal experience in the treatment of wounds in the surgical articles, there is little in our thirty-third annual issue to suggest that it has been produced during the strain and distraction of a great war which has imperilled our existence as a Nation.

It will be found that a most careful consideration has been given to each department of medicine and surgery, and that the final result will make this volume bear favourable comparison with any of its predecessors. The only outward sign of the difficulties we have encountered is in the exceptional lateness of its issue. All our contributors, fully occupied as they are in normal times, have been working under exceptional strain from military duties and contingent work, and the preparation of their sections for *The Annual* has proved a heavy addition to their labours. It would have been easy for each to have excused himself from writing this year, but not one has broken faith. The heroism of the medical profession has been very noteworthy during the war, and it is not only those who have found glory on the battlefield who have given proof that our profession is in earnest.

The issue of a new edition of "The British Pharmacopœia" at such a time is not an unmixed blessing.

We have articles dealing with its alterations and additions, and we have to thank Dr. O. C. M. Davis, Lecturer on Materia Medica and Pharmacology at the Bristol University, for the unification of the drugs in this volume in accordance with it.

We have adopted for this issue a new and more prominent type, which we think will render it easier to read.

We shall also be shortly publishing a "Synoptical Index" of the past ten volumes of *The Medical Annual*. This has involved great labour in preparation, but the previous indices have proved of so much value to the profession that we are sure it will be appreciated.

We are under a special obligation to our contributors who, under unprecedented conditions, have often sacrificed necessary rest in order to enable us to produce this volume.

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GLOSSARY

Containing most of the newer terms in this and recent volumes. Additions will be made annually.

Acapnia. — A state characterized by shortage of carbon dioxide in the blood. It is held by Yandell Henderson and others that this is a predominant factor in the production of shock.

Achlorhydria. — Absence of hydrochloric acid from the gastric secretions.

Activator.—A physical or chemical agent which renders active some other chemical agent. In medicine the term is applied almost exclusively to biochemical reactions.

Agglutinin.—A substance which has the power of agglutinating such cells as bacteria or red blood corpuscles. This power is usually specific, i.e., for each kind of cell there is a specific agglutinin, a principle utilized in the Widal test for typhoid fever. In **iso-agglutination** the reaction is wider, the agglutinin proving more or less active with all bacteria belonging to a certain group.

Allergy.—The altered reactivity of an infected animal or person to a second infection with the same poison.

Amboceptor. — A substance which has the specific power of binding complement (q.v.) to the cell (or bacterium) for which it (the amboceptor) is specific.

Amino-acids.—An organic acid in which one of the hydrogen atoms of the base is replaced by NH_2.

Anaphylaxis. — A specific susceptibility which may be manifested by an animal or person in response to a second injection of an organic substance the first injection of which was followed by no toxic results. The animal showing such acquisition of susceptibility is said to have become **sensitized** to that particular substance (see also **Allergy**).

Anisocytosis. — An inequality in size of the red blood corpuscles.

Anoci-association.—This word embodies the prevention of surgical shock as it is conceived by Crile, who teaches that shock is the result of expenditure of nervous energy under the influence of abnormal stimuli. According to him, shock is to be prevented by guarding the brain from such stimuli, by 'blocking' of nerve trunks in the area of operation, by preventing all possible sources of mental perturbation, etc. This process of cutting out deleterious stimuli is 'anoci-association.'

Antiformin. — A solution containing several alkaline compounds which is used in the laboratory for the separation of tubercle bacilli from pathological products (sputum, urine, etc.) which contain it.

Antigen.— Extract of bacteria or of tissue used in that class of serum tests of which the Wassermann reaction is the chief, and which is based on the 'fixation of complement' process. The complement (q.v.) is 'fixed' by the union of the antibody or amboceptor (q.v.), to which it is attached, with the antigen, i.e., to the extract of bacteria or tissue for which that amboceptor is specific.

Autogenous. — As applied to bacterial vaccines, this adjective denotes those vaccines which are made from the patient's own micro-organisms, as opposed to 'stock' vaccines, which are made from standard cultures.

Azoturic. — Pertaining to the urinary excretion of nitrogen.

Bacteriolytic. — That which dissolves bacteria.

Carcinolytic.—That which is destructive to cancer cells.

Chromaffin.—A hybrid word used as an adjective in connection with cells or tissues which display an affinity for chrome salts. Thus the 'chromaffin system' is composed of tissues which possess cells having this property; its components are the adrenal and other ductless glands, and parts of the sympathetic system.

Coliform. — An adjective denoting those micro-organisms which resemble B. coli communis.

Complement. — A substance present in blood serum, possibly of ferment nature, which, when linked by an amboceptor to a cell, constitutes with that amboceptor an agent capable of acting upon the cell. "The cell is the lock, the amboceptor the key, and the complement the hand that turns the key."

Cryoscopy.—Determination of the freezing point.

Diadokokinesis. — The performance of a rapid succession of alternating movements, e.g., pronation and supination.

Epinephrin —One of the various names used to denote the active principle of the suprarenal gland.

Glycyl-Tryptophane. — A compound of glycin and tryptophane radicles, used for a test in examination of gastric contents.

Hæmodynamic. — Relating to the movements involved in the circulation of the blood.

Hæmolysin.—A substance possessing the power of dissolving red blood corpuscles and liberating their hæmoglobin: if possessing this property in regard to the corpuscles of all animals of a certain group or species it is called an **Isohæmolysin.**

Heliotherapy. — Direct exposure to the action of the sun's rays for therapeutic purposes.

Herpetomonas.—A species of protozoon.

Heterogenous Vaccines are those prepared from organisms derived from some source other than the patient in whose treatment they are to be used; in such conditions the source is usually a 'stock' culture.

Hyperchlorhydria. — Excessive secretion of hydrochloric acid by the stomach.

Hyperpiesis. — Abnormally high arterial tension.

Hypertonic. — As applied to saline solutions, the adjective denotes those which contain a higher percentage of salt than normal human blood serum.

Hypodermoclysis. — Injection of quantities of fluid (e.g., normal saline) beneath the skin.

Karyosome (syn. Chromosome).—One of the small bodies into which the chromatin skein of the nucleus splits up in the earlier phases of karyokinesis.

Iontophoresis.—The introduction of ions into the body by the electric current, for therapeutic purposes.

Leucopoiesis. — The formation of leucocytes.

Lipoclastic.—Fat-splitting.

Lipoids are substances such as lecithin which enter into the formation of living cells, and which are like fats in their solubility in organic solvents such as alcohol and ether. These solvents can therefore be used for their extraction from the tissues.

Lipoproteins are combinations of protein with fatty acids.

Lymphopenia. — Deficiency of lymphocytes.

Meiostagmin Reaction.—A test used in the diagnosis of cancer, based on the estimation of interaction between antigen and antibody by measurement of the surface tension of a mixture of the two.

Metreurynter.—An instrument for artificial distention of the uterine cavity, e.g., a Champetier de Ribes' bag.

Microtia.— Congenital smallness of the ear.

Neurotropic. — That which 'turns towards' (i.e., has a chemical affinity for) nervous tissue.

Opotherapy.—The use of extracts of normal animal tissues as therapeutic agents.

Opsonic Index. — The ratio between the amount of 'opsonin' against a certain micro-organism contained in the blood of a person infected with that organism as compared with the content of similar 'opsonin' in a normal blood. '**Opsonins**' are substances contained within the blood serum which have the property of rendering micro-organisms fit for attack and ingestion by phagocytes.

Oxydases.—A group of ferments whose action is characterized by oxidation processes.

Phlebotomus Fever. — A three-day fever met with in the countries around the Mediterranean, also in India, conveyed by sand-flies.

Phosphatids are lipoid substances which are esters of orthophosphoric acid.

Pleocytosis. — Increase of cells (lymphocytes) in the cerebrospinal fluid.

Pleomorphic. — Varying in form (applied to bacteria).

Poikilocytosis. — Variation in the shape of the red blood corpuscles.

Polychromatophilia. — Variability in the staining affinities of the red blood corpuscles.

Polynucleosis. — Polymorphonuclear leucocytosis.

Polypeptide. — Peptides are compounds formed by the union of two or more amino-acids; polypeptides are formed by the union of more than three such acids.

Polyvalent Sera are those which contain antibodies active against many strains of the same micro-organism.

Pyelography. — *X*-ray photography of the renal pelvis after injection through the ureter of some opaque substance such as collargol.

Sensitization.—(See **Anaphylaxis**, above).

Spirillicidal.— That destroys spirilla or spirochætes.

Sporogeny. — Reproduction by spores, and especially sporulation after fertilization.

Thyrotoxicosis. — Poisoning by thyroid secretion.

Trophœdema. — Persistent œdema of the lower limbs; usually applied to Milroy's disease, a hereditary condition characterized by this type of œdema.

Trypanocidal.—That destroys trypanosomes.

THE MEDICAL ANNUAL

Part I.—The Dictionary of Materia Medica and Therapeutics: including Notes on the New British Pharmacopœia.

(See page 38.)

REVIEW OF THERAPEUTIC PROGRESS, 1914.

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DICTIONARY OF REMEDIES.

ADRENALIN.

McCord[1] has investigated the action of adrenalin in **Asthma.** He concludes that it extends the lumen of contracted bronchioles, and that this is the basis of its beneficial action in asthma. The dilatation follows whether adrenalin is administered subcutaneously, intravenously, or endobronchially. In any case the action is transient, but efficacious in relieving acute attacks. The most transient effect seems to be produced by the subcutaneous administration. Injection of adrenalin was found by Ott and Scott[2] to diminish the volume of the thyroid gland.

Watson's[3] experiments on three healthy young men show that the subcutaneous injection of adrenalin produces more alteration of the diastolic than the systolic blood-pressure. Both pressures begin to be affected within two minutes, but the systolic rise passed off in two of the cases in twenty-five and thirty-five minutes, whereas the diastolic fall lasted fifty-five and eighty minutes. Further, the fall measured in mm. Hg considerably exceeded the rise. Watson is inclined to think that the fall is possibly due to dilatation of the aortic orifices, with temporary regurgitation.

References.—[1]*Med. Rec.* 1913, i, 431; [2]*Ther. Gaz.* 1913, 781; [3]*Pract.* 1914, i, 94.

AMIDO-AZOTOLUOL.

Davis[1] records a unique case in which the application of amido-azotoluol ointment to Thiersch grafts resulted in excessive proliferation of many of them. Some assumed a papillomatous formation.

Histological investigation showed that the condition closely resembled the atypical epithelial proliferation produced by injecting scarlet-red oil subcutaneously under pressure into the rabbit's ear. Davis's case demonstrates the epithelial stimulating powers of amido-azotoluol. The subsequent course showed that there was no tendency to malignant degeneration of the thickened parts, which gradually come to resemble the surrounding tissue.

REFERENCE.—[1]*Ann. Surg.*, 1913, ii, 451.

ARSENIC. (*See also* ELARSON; GALYL.)

Harding[1] has tested the toleration of arsenic by the human system by experiments carried out on himself. Starting with $\frac{1}{60}$ gr. thrice daily, he found that it produced no urinary disturbance. The urine contained only $\frac{1}{50}$ gr. daily. The dose was gradually increased to $\frac{1}{30}$, $\frac{1}{20}$, and $\frac{1}{15}$ gr. thrice daily, and it was still found that only about 25 to 30 per cent was eliminated in the urine. The doses of $\frac{1}{15}$ gr. on an empty stomach produced some gastric disturbance, and 75 per cent of the arsenic appeared in the urine. By gradually increasing the dose he could eventually take $\frac{1}{5}$ gr. thrice daily after food without discomfort, but certain urinary changes appeared. By careful increases he managed to take $\frac{2}{3}$-, $\frac{3}{4}$-, $\frac{5}{8}$-, and 1-gr. doses, but these large doses required to be taken with dry food to prevent gastric disturbance. The percentage of arsenic in the urine remained as with the smaller doses, but more tissue appeared, and potash salts and urea increased. When the dose was further increased to $1\frac{1}{3}$ gr., lasting discomfort and purging were produced.

On discontinuing the drug entirely, he noted fullness after meals and general derangements, but on resuming it in rapidly diminishing doses these symptoms quickly passed off, and within a fortnight he was able to cut off arsenic entirely. The urine contained arsenic for eleven days after stopping the drug, and he noted that he became subject to nasal catarrh.

Mouneyrat[2] has brought out two new arsenical preparations to which he has given the names *sudyl* and *galyl*. (*See also* GALYL.) They are said to possess very marked trypanocidal and spirillicidal action. Conseil[3] has used them successfully in a small series of cases of **Relapsing Fever.** The dose varied from 30 to 50 cgrams dissolved in 100 c.c. distilled water, and was injected intravenously. A more concentrated solution may also be used. The injection produces a slight increase in fever, lasting for about two hours, followed by vomiting and diarrhœa. Within nine hours the spirilla disappear from the peripheral blood, and with their disappearance the temperature falls. If the injection is made during the interval between attacks, the blood remains free from spirilla. Lafont and Dupont[3] have used these drugs in **Trypanosomiasis,** and state that a definite curative action is obtained.

When the dose is 5 to 10 cgrams per kilo body weight, a permanent cure is obtained, the enlarged glands disappearing or becoming very

hard. Œdema disappears and the strength returns, with increased mental activity, etc.

REFERENCES.—[1]*Lancet*, 1914, i, 241 ; [2]*Bull. Soc. de Path. Exotique*, 1914, No. 2 ; [3]*Ibid.*

ATROPINE-SULPHURIC ACID.

This new type of atropine preparation, chemically considered, is an ester of atropine-sulphuric acid. It differs from atropine sulphate in its solubilities and in its crystallizing reactions. It is insoluble in all organic solvents, but dissolves readily in hot water and with difficulty in cold water. From atropine it differs in that the hydroxyl group of tropic acid is esterified, and at the same time the trivalent nitrogen is converted into pentavalent form. Phillipstal[1] has studied the physiological and therapeutic properties of the new compound, and finds that it paralyzes the terminations of the vagus, acting in fifteen to twenty minutes when injected intravenously. He states that occasionally it fails to paralyze the vagus. The sulphuric-acid ester acts upon the intestinal tract, causing a gradual paralytic effect about one-third to one-fifth that exerted by atropine. The lethal dose is at least twice that of atropine. Clinically the acid ester acted satisfactorily in **Asthma** in two out of five cases, **Distention of the Lungs** (vagus neurosis), in certain forms of **Tachycardia**, in the **Night Sweats of Phthisis**, and in **Iodism** ; but it seems of little use in gastric conditions.

Though slightly irritating at the site of injection, it does not produce the dryness of the throat, rapid pulse, or mental excitement often seen after atropine injections.

REFERENCE.—[1]*Berl. klin. Woch.* 1913, 2145.

AUTOLACTOTHERAPY. (*See also* MILK.)

Duncan[1] believes that antibodies are given off in the milk, and that it is a feasible plan to treat a nursing infant by means of the specific antibodies contained in its mother's milk. The organisms causing the diseased condition in the infant are grown, and the filtered culture-products are injected into the mother. In certain cases it appears sufficient if the mother swallows the filtered culture on an empty stomach. The simplest form of autotherapy consists in licking wounds as animals do. Thus adults may be immunized by making them swallow the discharges from their own wounds, or the filtered discharge may be injected subcutaneously. For chronic cases, animals may be injected and their milk used to feed the patients. Infants have little power of reaction to toxins of pathogenic organisms, and therefore it is better to produce antibodies by immunizing the mother, either by making her swallow the discharges or by injecting the secretion mixed with water and passed through a porcelain filter.

REFERENCE.—[1]*N.Y. Med. Jour.* 1914, ii, 464.

β-EUCAINE. (The lactate of this base is now known as **Benzamine Lactate, B.P.**)

Way[1] reports a case of poisoning in a healthy young adult from the use of a local injection of β-eucaine. The solution was freshly prepared with sodium chloride and a few drops of adrenalin, and a quantity containing about 2 gr. of β-eucaine was injected into the root and body of the penis. The symptoms of toxic action were faintness, pallor, slow laboured breathing, with increased pulse-rate. The pupils were contracted to pin-point. The breathing nearly stopped, and there was marked cyanosis. There was complete loss of consciousness. Under artificial respiration and injections of strychnine the patient rapidly recovered, and showed no after-effects except profuse sweating.

REFERENCE.—[1]*Jour. R.A.M.C.* 1914, ii, 209.

BISMUTH PASTE.

In a valuable article discussing the present position and value of bismuth paste in treating **Suppurative Sinuses** and **Empyemata,** Beck[1] points out that it is used for three purposes : diagnostic, therapeutic, and prophylactic. To ensure a correct anatomical diagnosis and tracing of the sinus tract to the true focus, the paste is invaluable. while in the treatment of old chronic sinuses and empyemata its value is beyond doubt. With improving technique better and better results are being obtained. Failure is often due to faulty technique, the paste failing to reach the primary focus, or to the presence of a sequestrum or foreign body. It is of great use in preventing the formation of sinuses after opening cold abscesses. The abscess is opened and injected at once with a 10 per cent bismuth paste, without suturing the opening or using a drain. The quantity used varies with the size of the abscess, but should not exceed 100 grams, because in fresh abscess walls absorption may take place. Of over 100 cases treated in this way, only 1 developed a severe secondary infection, and 4 resulted in sinuses. Within three or four days the thick, creamy pus obtained on opening the abscess changed to a straw-coloured, clear fluid, and in 90 per cent of the cases the abscess closed within three weeks of incision and injection. The paste is not painful or irritating, and is injected in a warm, semi-liquid state. To prevent the risk of bismuth poisoning, it is wise not to allow large quantities of the paste to remain in the body for absorption. Should symptoms appear, the paste should be removed by washing out the cavity with warm olive oil, which is injected sterile and retained for twelve to twenty-four hours, when it is removed by suction. After its removal all symptoms promptly cease. Scraping out the paste with a scoop is dangerous, as it may open fresh channels of absorption. Sinuses should be re-injected as long as micro-organisms are found in them, at intervals of a week or more.

Coerr[2] states that in his experience Beck's paste, containing 33·3 per cent bismuth, is the best application to use for Thiersch **Skin**

Grafts. The paste is thickly spread on strips of gauze six to eight layers in thickness, and laid directly over the grafts. Then a layer of cotton is applied and the whole fixed firmly with a bandage. The first dressing takes place on the fifth day, and the subsequent ones on every third or fourth day. He claims that this dressing is nearly ideal. The grafts are held firmly in place, exudation becomes almost negligible, and the growth of epithelium is stimulated. The resulting scar is soft and pliable, and shows no tendency to break down.

REFERENCES.—[1]*Ann. Surg.* 1914, i, 145 ; [2]*Amer. Jour. Surg.* 1914, i, 71.

BISMUTH SUBGALLATE.

Newman[1] strongly recommends the use of a subgallate of bismuth gauze instead of iodoform gauze. The bismuth salt is more stable, and resists the action of high-pressure steam, so that it can be effectually sterilized. It is cheaper than iodoform gauze, while it is of equal if not greater efficiency. There is an absence of the unpleasant odour of iodoform, and the bismuth preparation is non-toxic. The gauze is prepared by soaking it, slightly damped, in an emulsion of bismuth subgallate in a mixture consisting of glycerin 1 part to spirit 2 parts. The spirit is allowed to evaporate, and the slight feeling of dampness disappears on sterilizing the gauze in a high-pressure steam sterilizer.

REFERENCE.—[1]*Lancet,* 1913, i, 1794.

BLOOD TRANSFUSION.

In America a good deal of attention has recently been paid to the technique of blood transfusion, and this method of treating **Anæmia, Blood Diseases,** and **Toxæmias** is being extensively tested. The old method of direct transfusion from the donor's artery to the donee's vein has been abandoned in preference to indirect transfusion, in which the blood is withdrawn and a definite quantity injected. A preliminary set of test-tube tests is imperative to exclude syphilis, and the risk of hæmolytic and agglutinative reactions between the foreign and patient's blood. These preliminary tests seem fairly satisfactory, as Ottenberg and Kaliski[1] were able to perform over 100 injections without causing hæmoglobinuria (absence of hæmolysis). Apart from agglutinating and hæmolytic phenomena, a chill is very frequent after a transfusion, and so is pyrexia, while various rashes may occur. Divers methods have been devised to facilitate the operation by dispensing with assistance and preventing clotting of the blood. Minimizing injury of tissue in obtaining the blood is of importance. The blood can be obtained either by introducing a needle or cannula through the skin, and the blood aspirated or allowed to flow from the distended vein, or the vein may be exposed and opened sufficiently to permit the introduction of a glass cannula directly attached to a cylinder of glass (Hinman[2]). Satterlee and Hooker[3] delay the clotting of the donor blood by the aid of a small quantity of hirudin, while Moss[4] defibrinates the blood before injecting it. A common precaution is to coat the inside of the apparatus with a film of paraffin, which is introduced in a melted condition, while the apparatus is

rapidly rotated till it is completely coated, when the surplus paraffin is poured off.

The quantity of blood introduced seems to vary for adults from 200 c.c. up to 2000 c.c., and Lindeman states that he has frequently taken 900 to 1000 c.c. from one man at a single sitting. The recuperative power of a healthy donor is very great. On the whole, those who use this method of treatment seem assured that it benefits the patients.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1913, 2138; [2]*Boston Med. and Surg. Jour.* 1913, 783; [3]*Jour. Amer. Med. Assoc.* 1914, 1781; [4]*Amer. Jour. Med. Sci.* 1914, 698; [5]*Jour. Amer. Med. Assoc.* 1914, 993.

CALOMEL.

Schamberg and Kolmer[1] have devised a technique for testing the germicidal action of substances insoluble in water. The method does not distinguish between antiseptic action and germicidal power, but is simple, and surprisingly accurate in results. The insoluble substance is suspended in a 2 per cent sterilized solution of acacia in water. Quantities varying from 0·05 to 1 c.c. of the suspension are pipetted into a series of sterile Petri dishes, and 0·1 c.c of a twenty-four hours' growth of the test organism, followed by 10 c.c. of melted agar cooled to 40° C., is added. The whole is thoroughly mixed and incubated for twenty-four hours. Better and sharper results are obtained with the use of a fluid medium. To a series of tubes, each containing 10 c.c. of neutral bouillon, increasing amounts of the suspension and a constant amount of the test culture are added and incubated. The result shows that calomel has germicidal activity equal to that of perchloride of mercury. Apparently this is not due to any conversion of the calomel into the perchloride, or to the calomel being rendered soluble. They are unable to offer any explanation how the germicidal action is produced. It is not due to actual contact of each organism with a particle of the antiseptic. They find that other salts of mercury also possess the same strong germicidal activity, e.g., ammoniated mercury, red and yellow oxides, red and green iodide, etc. They suggest the trial of calomel suspensions in the treatment of **Cystitis, Pyelitis, Suppuration of Joints,** and **Sinuses.**

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 1950.

CHIONANTHUS VIRGINIANA.

Roux[1] states that the bark of dried roots of this plant is used empirically in America in **Hepatic Congestion.** The results are somewhat uncertain owing to the part selected, but if fresh sterilized plants are used the therapeutic results are remarkably better and more constant. He confirms the observations of Tcheltzoff that chionanthus considerably increases biliary secretion, the increase being more in the output of water than in the constituent elements of the bile. He believes that it has a specific action on the hepatic circulation, rendering it of signal benefit in all cases of congestion, more or less pronounced, whether of the liver or portal system. Though thus useful as a means

of relieving engorgement of the liver, chionanthus is only a feeble laxative, and in congestion of the liver it is well to combine it with a more powerful laxative.

REFERENCE.—[1]*Ind. Med. Gaz.* 1913, 394.

CHLORINE.

Pellegrini[1] recommends chlorinated alcohol instead of tincture of iodine for **Disinfecting the Skin.** Chlorinated alcohol is readily made by passing chlorine gas through alcohol, either pure or denatured. Its special advantages are that the skin is neither irritated nor stained by it.

REFERENCE.—[1]*Sem. Méd.* 1913, Sept. 24.

COAGULÈNE.

This substance is prepared by separation of the blood-platelets from mammalian blood by fractional centrifugalization. From this a cell-free preparation of thrombozyme is made. It is soluble in water and normal saline solution, and can be sterilized by heat. On exposure to air the watery solution rapidly undergoes deterioration, so that it must be used within twenty-four hours. A 5 or 10 per cent solution in sterile water was found by Fonio to hasten the process of coagulation at all stages in test-tube experiments, but in the human tissues it is only the end stage which is said to be hastened. On the other hand, the clotting takes place more quickly in the tissues than in the test-tube.

The clinical use of coagulène is thus described by Tarnowsky.[1] One gram is dissolved in 20 c.c. of sterile water and the solution boiled for five minutes. The solution may be slightly turbid, but does not require filtration. It is aspirated into a syringe, and at the operation a few drops of the fluid are directly applied to the bleeding or oozing surface. The only action is to accelerate and intensify the normal process of thrombus formation. Coagulène is valuable in **Laparotomies** to control oozing from separated adhesions, and to facilitate the closing of the abdominal incisions. It is useful when applied locally to bones, and in **Strumectomies** and **Rhinological** and **Laryngological Operations,** as a spray or plug. It is also used intravenously in **Hæmophilia, Hæmoptysis,** and **Internal Bleeding.**

Barth[2] finds the local application of a 10 per cent solution of coagulène of service in controlling hæmorrhage in operation work about the nasal cavities. Hotz[3] points out that in most cases it is much easier to control hæmorrhage in surgical operations by ligature than by the use of coagulène ; still, in some cases it is a valuable remedy when from any cause it is impossible to use the ordinary surgical hæmostatic measures, e.g., in wounds of the liver, gall-bladder separation, removal of large tumours or prostate, brain operations, etc. In cases of bleeding from hollow or parenchymatous organs coagulène has proved very successful. He mentions specially its value in the **Hæmorrhage of Prolonged Jaundice.** It appears to act in bleeding

from the inner surface of the gastro-intestinal tract even if administered internally. Fonio[4] has successfully used the drug intravenously for **Hæmophilia, Purpura,** and **Bleeding from Tumours,** and Hotz found the intravenous injection of 20 c.c. of a 5 per cent solution check a prolonged hæmoptysis.

REFERENCES.—[1]*Surg. Gyn. and Obst.* 1914, i, 641 ; [2]*Deut. med. Woch.* 1914, 1573 ; [3]*Ibid.* 1475 ; [4]*Mitteil. Grenzgeb. d. Med. u. Chir.* 1914, 642.

COLLOIDAL METALS.

Rae[1] has used *electro-cuprol* in a case of **Inoperable Cancer of the Cervix Uteri,** injecting 5 c.c. daily into the muscles of each buttock alternately. Pain ceased after the fourth injection, and ten days later all vaginal discharge stopped. Later, 10-c.c. injections were given. After four months' treatment the uterus appeared to be slightly more mobile, as if some absorption of inflammatory products had occurred. *Erythroselenium* ℞, in 5-c.c. doses injected subcutaneously in the neighbourhood of a secondary fungating mass surrounding a colotomy wound, relieved pain, cleaned the tumour, and caused a ravenous appetite to develop, but apparently did not effect a cure, as the patient died six months after the colloidal treatment was instituted. In tuberculosis, colloidal iodine has proved unsatisfactory in his experience.

REFERENCE.—[1]*Univ. Med. Rec.* 1914, 398.

CORPUS LUTEUM. (*See also* OVARIAN EXTRACT.)

Seitz, Wintz, and Fingerhut[1] have prepared from fresh corpus luteum of the cow a cholesterin-free lipoid insoluble in alcohol but soluble in ether and acetone. This they term luteolipoid. Experiments on animals show that administration of large doses over a long period causes a slight hyperæmia of the genital organs, but no hypertrophy of the uterus. With these large doses the coagulation time of the blood is shortened, and in castrated animals is made normal. In the smaller doses used in human beings, there is no effect at all upon the blood, but a notable action on menstruation. In cases of pure menstrual disturbance not dependent on organic changes, inflammation, or tumours, the injection of luteolipoid checks **Menorrhagia** and makes the periods become regular in type. This regulating action is best exhibited in the menstrual disturbance often seen at the onset of puberty, and also in the functional menorrhagia and metrorrhagia of adult life. In hæmorrhage at the climacteric the action of the drug is not satisfactory. They advise that it should be injected a day or two before the period is expected. It is still fairly efficient if given on the first day of menstruation, but if the administration is only commenced on the second day the action is less marked and the dose requires to be increased. They cannot give any explanation of the drug's action.

Dannreuter[2] records a case of double salpingo-oophorectomy in which the administration of corpus luteum extract was followed by re-establishment of regular menstruation. The specimens show that

no ovarian tissue was left at the operation. Dannreuter recommends an extract made from the corpus luteum of pregnant animals. The dosage should not exceed 5 gr. thrice daily. A slight fall of blood-pressure is induced, and care is required not to allow a greater fall than 15 mm. below normal. Clinically he finds corpus luteum treatment of great value in **Functional Dysmenorrhœa, Disorders of Puberty and Menopause, Hyperemesis of Early Pregnancy,** etc.

REFERENCES.—[1]*Münch. med. Woch.* 1914, 1657; [2]*Jour. Amer. Med. Assoc.* 1914, i, 359.

COTOIN.

This substance is stated to possess properties which render it a valuable **Antidiarrhœic.** Hitherto the explanation of Albertoni has been accepted, viz., that the drug causes a vasodilatation in the splanchnic area, as a result of which the intestine is better supplied with blood and thereby enabled to absorb foodstuffs more rapidly and to resist the attacks of deleterious organisms. Inpens[1] has recently investigated the pharmacological properties of cotoin and allied substances, and finds that even in weak solutions they reduce the muscular tonus of the gut very powerfully, and at the same time almost completely abolish the swinging peristaltic movements. He thinks that this effect upon tonus and peristalsis is the real reason of the antidiarrhœic action.

REFERENCE.—*Deut. med. Woch.* 1913, 1827.

DIAL-CIBA.

Under this trade-name diallylbarbituric acid has been introduced into practice as a **Sedative** and **Hypnotic.** The chemical formula is

$$\begin{matrix}CH_2{=}CH.CH_2\\CH_2{=}CH.CH_2\end{matrix}\!\!>\!C\!<\!\!\begin{matrix}CO{-}NH\\CO{-}NH\end{matrix}\!\!>\!CO.$$

It occurs as white, glistening crystalline plates, which are only soluble with difficulty in cold water, but more soluble in alcohol and ether. A weak acid, it forms, with dilute soda solution, soluble sodium salts which, after prolonged standing, especially in the presence of heat, decompose into the insoluble diallylacetureide. The acid is readily oxidized, but is not affected by acids. Investigation of the pharmacological properties shows that the drug is relatively powerful as a hypnotic and narcotic, acting in much smaller doses than veronal. Unlike veronal, the drug seems to be completely combusted in the tissues, so that it cannot be recovered from the urine. Juliusburger,[1] after extensive clinical trial of the new drug, states that it is a valuable addition to our known sedatives. It is not of any value in marked psychomotor excitement, but is very useful in **Depression, Sleeplessness,** and in the cure of **Alcoholism** and **Drug-taking.** It is not markedly cumulative, and is not likely to produce gastro-intestinal or urinary disturbance, or drug rash. Hirschfeld[2] also warmly recommends it as a useful hypnotic and sedative. Zuelchauer[3] confirms these favourable reports. Slight degrees of sleeplessness require one tablet (0·1 gram) half an hour

before bedtime ; in severer cases, or if the sleeplessness is due to a psychosis, a dose of two, three, or four tablets is required. As a sedative in excitement one tablet thrice daily is indicated. Should the drug lose its action after long-continued use, it is well to stop the administration for a day or two. [Dial-ciba seems, according to these reports, to be rather stronger in its action than other derivatives of barbituric acid. It acts in a smaller dose, and is apparently broken up in the tissues. The effective dose is stated to be considerably cheaper than that of most of the newer hypnotics.—F. J. C.]

REFERENCES.—[1]*Berl. klin. Woch.* 1914, 643 ; [2]*Deut. med. Woch.* 1914, 1221 ; [3]*Ibid.* 951.

DIGIFOLIN.

According to Hartung,[1] this preparation contains all the glucosides of digitalis leaf which act beneficially on the heart, while the saponin derivatives are removed. It is said to have a very accurate action, and to be little affected by the gastric and intestinal juices. Löwenheim[2] has satisfied himself, from testing the drug in a series of 150 cases representing different types of cardiac disease, that digifolin is a reliable, rapid heart tonic. It is easily administered, and the dose can be regulated accurately. In his experience it acts best in **Mitral Disease, Myocarditis,** and **Arteriosclerosis with Failing Heart.** The most marked and rapid effect is the increased diuresis, which sets in within a few hours, before the pulse is slowed. The diuretic action appears on the first day, and reaches its height on the fourth or fifth day, falling gradually after the eighth day. As a rule five tablets—each corresponding to 0·1 gram digitalis leaf—were given for three days, then the drug was stopped, and resumed after an interval of not less than eight days. Peiper[3] has used digifolin in fifty cases, and states that it is a useful form of administering digitalis over a considerable period, as it is reliable, with easily regulated dose, and does not produce gastric irritation. It can also be used subcutaneously in cases of **Collapse,** but should not be injected into œdematous parts. Often there is pain after the injection, but this passes off in twenty-four hours.

REFERENCES.—[1]*Münch. med. Woch.* 1912, No. 36 ; [2]*Ibid.* 1913, 2502 ; [3]*Deut. med. Woch.* 1914, 1254.

DIGIPAN.

This seems a similar type of preparation to the above. It is claimed that the irritating digitonin is removed, while the therapeutically active digitalis glucosides remain. It is used in the form of a solution and as tablets. Weiss[1] states that it is a useful preparation, exerting a potent diuretic effect. Internally the tablets act better than the solution, for some unknown reason. A very prompt therapeutic response is obtained to the intravenous or intramuscular injection of digipan, but the subcutaneous injection is followed by pain.

REFERENCE.—[1]*Münch. med. Woch.* 1913, 2499.

DIGITALIS. (*See also* DIGIFOLIN, DIGIPAN.)

Legge Symes[1] has tested the activity of a series of tinctures of digitalis, which were examined within a few days of manufacture and at varying periods afterwards, to determine their stability. He finds that few tinctures are, initially, below standard, but tinctures above standard may vary from 200 to 300 per cent in activity. All such tinctures, after a variable period of constant activity, undergo deterioration, which may commence within a month of manufacture, and in a year may amount to 70 per cent or more of their initial activity. Concentrated alcoholic extracts of digitalis leaf compare favourably with, and behave as, the official B.P. tinctures. Commercial non-alcoholic tinctures and allied preparations are not trustworthy, but solutions of crystalline French digitaline (German digitoxin) are more stable than the tinctures and alcoholic extracts.

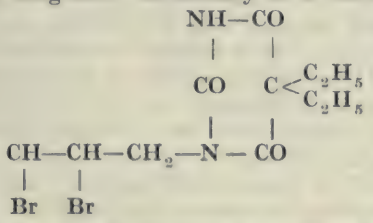
Oppenheimer[2] points out certain differences between the action of easily soluble crystalline heart-poisons, as strophanthin and antiarin, and of the more insoluble bodies, amorphous digitoxin, digitalin, digalin, oleandrin, saponin, and methyl violet. Dissolved in serum, the amorphous group are either entirely inert or much less active than when dissolved in Ringer's solution, whereas serum seems to facilitate and increase the toxic action of the crystalline group. How the serum acts is not known. It does not seem to depend upon the presence of cholesterin, albumin, or lecithin.

Goodall and Reid[3] have investigated the effect of peptic and pancreatic digestion on the activity of tincture of digitalis. Peptic digestion has comparatively little action, but the effect of pancreatic trypsin may be considerable, and under artificial conditions an exposure of six hours may materially reduce the potency of the tincture. Thus only two out of six samples retained full potency; two lost potency to an extent not exceeding 30 per cent, and two to an extent not exceeding 50 per cent. In actual clinical conditions it is very unlikely that the severe conditions of this laboratory test would be met.

REFERENCES.—[1]*Brit. Med. Jour.* 1914, i, 1343; [2]*Biochem. Zeits.* 1913, 134; [3]*Lancet*, 1914, i, 1678.

DIOGENAL.

A new bromine derivative of veronal has been put upon the market under the name of diogenal. Chemically it is dibrompropyldiethyl-barbituric acid



A white, slightly bitter, crystalline powder, diogenal is almost insoluble in water and acid solution, but gradually dissolves in weak alkaline

solutions. It is devoid of local irritating action even on such sensitive structures as the conjunctivæ. It is not a protoplasmic poison. In frogs it produces no sedative action when injected into the lymph sac or given by the mouth. In rabbits it is weaker in action than veronal, about three to four times the dose of veronal being required to produce a similar action. Prolonged administration shows that diogenal is not irritating to the kidneys or gastro-intestinal tract, and exerts no deleterious action on the blood or circulation. About 20 per cent of the available bromine is given off in the fæces and about 38 per cent in the urine. The urinary excretion is very gradual ; most is given off in the first three days, but bromine is still present for fourteen to twenty days. Apparently a large portion is retained in the body tissues.

These animal experiments of Heinz[1] have been supplemented by the clinical observations of Mörchen.[2] He finds that the taste is not unpleasant. It is a weak hypnotic, even in doses of 2 grams producing no overpowering desire for sleep. It is, therefore, of no value as a hypnotic in excitement or in restless patients. On the other hand, it is a valuable sedative in all cases of **Nervous Disease** and **Abnormal Mental States.** It does not seem to produce any side effects, and is not cumulative in action. As an average dose for a case showing slight restlessness, 0·5 gram thrice daily is indicated, and for severer types of excitement 1 gram thrice daily is required.

References.—[1]*Münch. med. Woch.* 1913, 2618 ; [2]*Ibid.* 1913, 2671.

ELARSON. (*See also* Arsenic.)

Elarson is a new type of arsenic preparations in that the arsenic is combined with a body of the fatty acid series. Chemically, elarson is the strontium salt of chlorarsenobehenolic acid : It is insoluble in water, but in hydrochloric acid solution corresponding to that of human gastric juice, to the extent of 55 per cent it is converted into free chlorarsenobehenolic acid, thus preserving the lipoid characteristics. In the alkaline intestinal juices, in all probability alkali salts of this acid are formed and absorbed. In animal experiments apparently 25 per cent of the arsenic available is excreted in the fæces ; the remaining 75 per cent is absorbed. Commercially elarson is supplied in tablets, each containing $\frac{1}{2}$ mgram of arsenic. It is given in very varying dosage from 1 to 3 tablets for children, up to 15 to 20 tablets daily for adults. It is stated by various writers to be very useful in the treatment of **Secondary Anæmia,** and it does not cause gastro-intestinal disturbance (Reinhard,[1] Walterhöfer,[2] Tuszewski[3].) The last-named writer states that elarson was of no use in two cases of pernicious anæmia, and in chlorosis the additional action of iron is often required. Scheibner[4] speaks highly of an elarson tablet containing 0·03 gram iron and 0·0005 gram arsenic as specially useful in **Chlorosis** and in secondary anæmia. It improves the appetite, stimulates the general condition, and is devoid of irritant properties.

References.—[1]*Jahr. der Hamburg. Krankenanst.* 1913 ; [2]*Med. Klin.* 1913, No. 42 ; [3]*Münch. med. Woch.* 1913, 2907 ; [4]*Berl. klin. Woch.* 1914, 553.

ELECTRARGOL.

Denman[1] states that in his experience in Mauritius the intravenous injection of electrargol gives patients suffering from severer forms of **Small-pox** a much better chance of recovery than other methods of treatment do. In the period under review 1914 cases of small-pox with 196 deaths were observed. Of these, 1309 cases were treated in one central small-pox hospital, and 124 died. Most of the cases were mild in type and, apart from segregation, required no special treatment ; but 259 cases of confluent or hæmorrhagic small-pox were seen. The effect of electrargol treatment is shown in the following table :—

Nature of Case	Treatment	No.	Cured	Died	Mortality
Confluent ..	Simple ..	94	29	65	69·1%
	Electrargol ..	136	115	21	11·4%
Hæmorrhagic	Simple ..	9	1	8	88·8%
	Electrargol ..	20	15	5	25·0%

The exact amount of the dose is not stated, but in one severe case 50 c.c. were given every twenty-four hours for three days. In **Plague** the early administration of the drug seems to reduce the mortality, especially in the simple bubonic type. Unfortunately it is of no use in abubonic or pneumonic plague. He advises that, as soon as diagnosis is made, electrargol in large doses should be injected intravenously every twenty-four hours, up to the end of the fifth day, no matter what the temperature and pulse are doing.

REFERENCE.—[1]*Brit. Med. Jour.* 1914, i, 1236.

ELECTRO-CUPROL. (*See* COLLOIDAL METALS.)

EMBARIN.

This mercurial preparation contains 6·6 per cent of sodium mercurisalicyl-sulphonate made up with 0·5 per cent acoin as an anæsthetic. It contains, therefore, 3 per cent mercury, and is obtained in sealed phials containing 1·2 c.c. In **Syphilis** it is injected intramuscularly every second day, commencing with a small dose of 0·4 c.c., then 0·8 and 1·2 c.c. A course of treatment consists of fifteen to twenty injections. If properly injected into the muscular tissue the drug caused little local irritation. Authorities differ as regards the amount of constitutional disturbance produced. Possek[1] in 49 patients found 2 absolutely refractory to embarin. In addition to these two patients 2 others reacted with fever to the injections. Planner[2] was less successful with 34 cases in which he used embarin injections: 5 out of 26 men and 3 out of 8 women were unable to use the drug on account of the sharp febrile disturbance produced. As a rule the reaction appeared after the injection had been repeated several times, coming on a few hours afterwards, associated with slackness, headache, and loss of appetite. In one of his cases the fourth injection was

followed by a rigor and a measly rash, while Sowade[3] reports a similar case with a scarlatiniform rash. In 17 per cent of his patients the injections caused distinct constitutional disturbance. In patients who can tolerate the injections the drug acts as a powerful anti-syphilitic remedy.

References.—[1]*Berl. klin. Woch.* 1914, 303; [2]*Deut. med. Woch.* 1913, 1940; [3]*Ibid.* 1913, No. 20.

EMETINE. (*See also* Amœbiasis.)

Barlow[1] has used emetine successfully in doses of $\frac{1}{5}$ to $\frac{1}{7}$ gr. hypodermically in **Dysentery** of young children. According to Archibald,[2] young children are extremely tolerant of emetine, and in dysentery one may commence with a dose of $\frac{1}{6}$ gr. for a child of two years and repeat this dose every twelve hours till $\frac{1}{2}$ gr. in all has been given. McCaskey[3] records a case of dysentery which had lasted thirteen years and was cured by emetine.

Its value in **Abscess of the Liver** following dysentery is highly spoken of by Gaide and Mouzels.[4] Its action is not always sufficiently potent alone to render surgical interference unnecessary, but it powerfully assists the process of cure and enables apparently desperate cases, even of multiple abscess, to recover. Dopter and Pairron[5] state that even without evacuation of the abscess, emetine is of value by arresting the suppurative process. The contents of the abscess then are no longer chocolate, but become grey and fluid, and on opening the abscess healing is very rapid. Dopter states that in eight months he has seen 10 out of 48 cases of dysentery relapse after emetine treatment.

References.—[1]*Amer. Jour. Trop. Dis.* 1914, i, 864; [2]*Jour. Trop. Med.* 1914, 161; [3]*Jour. Amer. Med. Assoc.* 1914, i, 534; [4]*Bull. Soc. de Path. Exotique*, 1913, No. 10; [5]*Bull. Soc. Méd. des Hôp. de Paris*, 1913, Dec. 4.

ENEMATA.

Mechling[1] points out that a rubber rectal tube cannot be passed beyond the rectum owing to the anatomical obstructions normally present—rectal valves, folds of mucous membrane, pelvi-rectal flexure. Pneumatic proctoscopes can be readily passed through and beyond the pelvi-rectal bend. Thus with ordinary rubber tubes the term 'high' enema is a misnomer. There is no enema except the 'low' enema. The colon can, however, easily be filled by rectal injections, the fluid being carried by gravity or retrograde peristalsis.

Drummond,[2] from examination of patients, states that enemata invariably travel to the cæcum, but rarely any further in normal cases, and when they do pass the iliocæcal valve there is usually some pathological condition present, rendering the valve and sphincter incompetent. Enemata of bismuth or barium, injected slowly and rhythmically by means of a Higginson's syringe, with the patient lying on his back, reach the cæcum in about ten minutes—rarely before about one pint of fluid has been introduced, and as a rule one

and a half or two pints are required. If injected more rapidly the cæcum was reached sooner. He has not satisfied himself that antiperistalsis occurs, and cannot state whether the passage of the fluid is not simply due to hydrostatic pressure.

REFERENCES.—[1]*Amer. Jour. Surg.* 1913, ii, 420; [2]*Brit. Med. Jour.* 1914, i, 241.

ERYTHROSELENIUM. (*See* COLLOIDAL METALS.)

FIXATION ABSCESS.

Lostalot[1] considers the fixation abscess a valuable remedy in cases of infection apparently taking a turn for the worse. It may be usefully employed in cases of **Puerperal Septicæmia, Infectious Pseudo-rheumatism, Pneumonia, Appendicitis, Typhoid Fever,** and similar conditions. To produce the abscess 2 c.c. of pure essence of turpentine are injected under the skin in the gluteal region under aseptic conditions. A sharp pain will follow the injection, but is immediately relieved by hot fomentations. At the end of three or four days the abscess will have formed sufficiently, and the pus may be evacuated by a small incision. The cavity should not be drained, but twice a day a Bier's cup should be applied. At the end of a week the abscess will be healed. In some cases the temperature begins to come down even before the abscess is opened, but in most instances the lowering of fever follows the opening of the abscess.

REFERENCE.—[1]*Lancet*, 1913, ii, 1118.

GALYL. (*See also* ARSENIC.)

Instead of salvarsan, Brunor[1] has used a French preparation, galyl (tetra-oxydiphosphaminodiarsenobenzene). His experience is limited to ten cases of **Syphilis,** but the results are satisfactory. Using as a single dose 0·4 gram dissolved in 25 c.c. of distilled water made slightly alkaline with sodium carbonate; this is injected into a vein. As a rule the amount of the drug needed to cure a fresh case, i.e., to render the Wassermann reaction negative, is 1 gram for an adult weighing 150 lb. In old cases of syphilis the amount required is approximately 3 grams. Two or three injections are required to cause primary lesions to disappear, and between three and six for secondary and tertiary lesions. Subsequent mercurial and iodide treatment is advised. The effect of galyl is fairly marked. Nearly all cases complain of nausea, one-third had vomiting, and one both vomiting and diarrhœa. Two had congestive symptoms, intense facial redness, lacrymation, coryza, and hoarseness. In two cases there was transitory blindness lasting for a few minutes. The injections are given at weekly intervals. Abraham[2] has also tested galyl, and states that the clinical results are as rapid as with salvarsan. His experience is also limited to ten cases.

REFERENCES.—[1]*Amer. Med.* 1914, ii, 175; [2]*Brit. Med. Jour.* 1914, i, 568.

GELATIN CAPSULES, FORMALDEHYDE-HARDENED.

Ballenger and Elder[1] state that the gastric disturbance produced by drugs like sodium carbonate, iodides, balsams, etc., can be prevented if they are administered in soft gelatin capsules, hardened slightly by exposure to formalin vapour or by immersion in a solution of formaldehyde. Unless the capsules are to be used immediately, only slight hardening is necessary, e.g., immersing the filled capsule in a solution of one part of 40 per cent formaldehyde solution in forty to sixty parts water for one minute. The capsules are kept for over two weeks before being used. A more satisfactory method is to expose the capsules in a closed vessel to the vapour of formaldehyde for several hours (six hours for capsules which can be kept for two weeks, twelve hours for capsules to be used immediately). According to the authors, the hardened gelatin capsules do not dissolve in the stomach. An even better plan is to reduce the drug to a very fine powder and incorporate it with melted paraffin and suet. The proportions required for 90 parts of the powdered drug are 30 parts suet and 16 parts paraffin. This while melted is filled into 00 gelatin capsules, which are then apparently hardened by formaldehyde. It is claimed that even if the capsule dissolves in the stomach, the absence of a fat-splitting ferment in the gastric juice ensures that the drug is not liberated in amounts which will irritate the stomach. They state that they have obtained excellent results in the treatment of **Albuminuria** and casts with sodium carbonate, as it is easily possible to alkalinize the urine without producing gastric irritation.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 197.

GLUCOSE. (*See* Saline Solution.)

HEXAMETHYLENAMINE (Hexamethylenetetramine or **Hexamine, B.P.).**

In the normal individual the only solutions of sufficient concentration in H ions to split up the drug are the acid urine and the gastric juice. Hanzlik[1] has tested the effect of pathological fluids, and finds the same laws operative as in health. Liberation of free formaldehyde is only obtained when there is excess hydrogen ion concentration of the fluid (true acidity). Thus in nephritis, provided the urines are truly acid, free formaldehyde is obtained ; but in neutral fluids no free formaldehyde is got. He failed to detect free formaldehyde in cerebrospinal fluid, bile, ascitic fluid, pleural fluid, or the serum of dropsical limbs, though all contained hexamethylenamine after oral administration of the drug.

Thomson Walker,[2] in discussing urinary antiseptics, directs special attention to the following points :—

1. The dosage of hexamine should be increased until an antiseptic action is obtained or the limits of tolerance are reached.

2. The reaction of the urine must be carefully tested and the acidity, if necessary, raised by means of drugs until the point of dissociation of urotropine is reached.

3. Diuretics and diuretic waters interfere with the splitting of urotropine, and should be avoided during its administration.

4. The Rimini-Burnam test for formaldehyde must be in constant use when urotropine is being administered.

5. Urinary antiseptics of the formaldehyde series are harmful or useless: (*a*) in very acute inflammation of the urinary organs; (*b*) in pure tuberculosis infection of the urinary organs; (*c*) where the urine is alkaline.

Hinman[3] finds that the conversion of hexamethylenamine into formaldehyde is a simple chemical process readily occurring in acid but not in alkaline mediums. The amount of hexamethylenamine excreted in the urine is influenced by the dose, frequency of administration, and by changes which occur in the acid contents of the stomach. The subsequent conversion of the drug into free formaldehyde depends on the acidity of the urine, duration of exposure, and amount of hexamethylenamine present. To ensure the requisite amount of formaldehyde to act as an antiseptic, the acidity should be greater than 2 c.c. of tenth-normal sodium hydroxide for 10 c.c. of urine. The acidity may be temporarily increased by certain drugs. At the level of the kidneys 15-gr. doses thrice daily have no antiseptic action. Though some formaldehyde is present in the bladder urine of practically all patients receiving 15 gr. t.i.d., this dosage is too small to produce uniform antiseptic action in every case. His investigations of a number of allied hexamethylenamine compounds failed to demonstrate any superiority as antiseptic over the pure drug.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1914, 295; [2]*Edin. Med. Jour.* 1914, 503; [3]*Jour. Amer. Med. Assoc.* 1913, 1601.

HYOSCINE (Scopolamine).

Straub[1] has investigated the keeping properties of watery scopolamine solutions, and finds that there is a steady deterioration through a slow process of saponification. The addition of the hexavalent alcohol, mannite, very markedly interferes with the saponification and conserves the activity of the scopolamine solutions. He therefore advises the addition of 5 to 20 per cent of mannite to the solution.

REFERENCE.—[1]*Münch. med. Woch.* 1913, No. 41.

IODIDES.

Macht[1] has investigated the action of the iodides on the circulation. The individual component ions of sodium and potassium iodide have different effects upon the circulation. The potassium ion in Locke's solution when perfused through the circulation is depressant, and markedly depresses the heart and relaxes the blood-vessels. On the other hand, the sodium ion slightly stimulates blood-vessels. The iodine ion powerfully stimulates both heart and vessels when perfused through isolated organs, but when mixed with blood in intact animals the iodine combines with blood proteids and thus inhibits the stimulant action. Blood-pressure tracings indicate that the sodium salt has no

depressing action on the circulation, but potassium iodide clearly shows the depressant effect of the potassium ion on heart and vessels, not only in isolated organs, but also in intact living animals. This is entirely a potassium action, as the iodide itself has no depressant action.

REFERENCE.—[1]*Johns Hop. Hosp. Bull.* 1914, 278.

IODINE.

Robb,[1] after careful experimental investigation of the effect of iodine on the human and dog's skin, concludes that tincture of iodine in all probability possesses a definite inhibitory action upon the growth of bacterial forms. But sterilization with tincture of iodine is not to be relied upon, and should be used only when more elaborate forms of sterilization are contra-indicated. His experiments were ingeniously devised to differentiate inhibiting from germicidal action. When the iodine is allowed to dry on the skin, scrapings of the skin were sterile in 18 out of 21 cases, but if the iodine was removed with 10 per cent potassium iodide solution and subsequent washing with sterile water, the skin scrapings were only sterile in 12 out of 21 cases. This indicates that the action of iodine is mainly that of inhibiting growth, and that it does not actually kill off the germs. The same result is seen when iodine is used in test-tube experiments. If a trace of tincture of iodine is added to cultures, no growth occurs; but if the iodine is washed off again, growth occurs.

Weller[2] states that tincture of iodine administered orally gives good results in **Graves's Disease.** It will not cure the disease, but gives a strikingly beneficial result in a few days, reducing a turbulent irregular pulse of 160 to a steady one of 80 or 90 beats per minute. Palpitation, diarrhœa, and vomiting cease, and weight is gained. Frequently menstruation becomes more normal. The goitre will probably increase in size and become harder. On stopping the iodine administration there may be a sudden and severe relapse in from one to three weeks. As a rule 5 min. thrice daily is sufficient to administer. In such quantities it may be given with impunity for months with occasional breaks. Occasionally the iodine treatment produces a condition of great pallor, which makes the patient look very ill.

REFERENCES.—[1]*Surg. Gyn. and Obst.* 1913, ii, 324; [2]*Prescriber*, 1914, 153.

ISTIZIN.

According to Klave[1] this (dioxyanthrachinone) is a very useful purgative. In doses of 5 gr. it causes a soft, easy, painless movement of the bowels in twelve to fifteen hours. It is tasteless and does not upset the digestion. Frequently he notes that the laxative action lasts for several days after its use. In his opinion it is specially indicated for the treatment of **Chronic Constipation.**

REFERENCE.—[1]*Deut. med. Woch.* 1914, 440.

LAROSAN.

This casein preparation contains 2·5 per cent CaO, and is recommended by Kamnitzer[1] in the dietetic disturbances of infants. He

gives it in the form of a 2 per cent solution in milk diluted with an equal portion of water. It is well borne, and acts satisfactorily in all forms of gastro-intestinal disturbance, whether acute, subacute, or chronic. Within two to five days the stools become formed.

REFERENCE.—[1]*Deut. med. Woch.* 1914, 855.

LAUDANON.

This is a mixture of definite quantities of six alkaloids of opium. One c.c. laudanon contains morphine hydrochloride 10 mgrams, narcotine hydrochloride 6 mgrams, codeine hydrochloride 1 mgram, papaverine hydrochloride 2 mgrams, thebaine and narceine hydrochlorides each 0·5 mgram. It is claimed that the mixture represents the useful actions of opium, and that the respiratory and vomiting centres, owing chiefly to the thebaine, are less affected than when morphine alone is administered. Oertel[1] has therefore used laudanon in **Midwifery** practice in the hope that the respiratory centre of the infant would not be depressed. He found that suitable doses markedly relieve the pains of labour without, in most cases, unduly weakening the uterine contractions. The child does not suffer, as it was only very occasionally (1 out of 70 cases) that depression of the respiratory centre was noted. The use of the drug does not tend to cause post-partum hæmorrhage. Oertel states that in **Eclampsia** it diminishes the convulsions.

REFERENCE.—[1]*Münch. med. Woch.* 1914, 694.

MAGNESIUM SULPHATE.

McClintock and Hutchins[1] state that they found subcutaneous administration of magnesium sulphate of no use in the treatment of experimental tetanus of sheep. Thiroloix and Mairesse[2] record their belief that the deep subcutaneous injection of 4 c.c. daily of 25 per cent solution of magnesium sulphate is of considerable value in **Acute Rheumatism.** Pain is lessened, the disease shortened, and fever diminished, but the injections alone are not sufficient to cure the rheumatic manifestations, and therefore the salicylates are still required. They give the patient each day from 4 to 6 grams of sodium salicylate and one subcutaneous injection of 4 c.c. of 25 per cent magnesium sulphate solution. The injection is painless and produces no local or general disturbance. As a rule not more than four injections are required, as the pain, swelling, and fever rapidly disappear.

REFERENCES.—[1]*Jour. Infect. Dis.* 1913, 309; [2]*Bull. Gén. de Thér.* 1914, ii, 96.

MELUBRIN.

This derivative of antipyrin is stated to be useful in the various acuter manifestations of **Rheumatism.** Large doses require to be used, and occasionally gastro-intestinal disturbances have been noted. Benno Hahn[1] has accordingly investigated the effect of intravenous administration. In watery solution, the drug undergoes alteration,

the clear, colourless solution turning yellow, but the toxicity of the solutions is not increased by this change. In a series of forty cases of rheumatism treated by intravenous injection, he noted only in one case any ill effects, and this patient seemed to possess an idiosyncrasy against melubrin, as oral administration of 1 gram produced vomiting and purging, and injection of 0·50 gram intravenously, gave rise to similar symptoms. No irritation of the kidney or cardiac disturbance was noted, even when such large doses as 4 grams daily were injected. The therapeutic results were satisfactory, in many cases rapid relief being obtained. As a rule he used a 50 per cent solution, 5 to 6 c.c. of which were injected thrice daily.

Riedel[2] points out that though undoubtedly the intravenous injections are active, the frequent repetition is very troublesome. In the course of his experiments he found that the subcutaneous or intramuscular injection is easier than the intravenous method. It is painless and is as active therapeutically. While excretion in the urine in both cases commences within ten minutes, the intramuscular injection leads to a more prolonged excretion lasting forty-eight hours, whereas intravenously given it is removed within thirty hours. Riedel says the best method is to inject into the gluteal muscles. In severe cases three, in moderate cases two injections daily of 3 grams each dissolved in 8 c.c. of water are required.

REFERENCES.—[1]*Münch. med. Woch.* 1913, 2232 ; [2]*Ibid.* 2454.

MILK. (*See also* AUTOLACTOTHERAPY.)

Rosenberg[1] states that the milk of animals immunized against bacterial diseases acquires the same antibodies as are developed in the blood-serum. He thinks advantage may be taken of this in the treatment of tuberculosis and typhoid fever. He claims to have demonstrated in guinea-pigs the protective value of the milk of immunized animals. Passive immunity and protection against infection may be obtained by drinking the milk of immunized animals. Six ounces for five alternate days produces protection against typhoid and tuberculosis. The milk must be taken on an empty stomach. He suggests that in actual infection it should also prove useful.

REFERENCE.—[1]*N. Y. Med. Jour.* 1913, ii, 718.

NARCOPHINE.

Narcophine, a double salt of morphine and narcotine with dibasic meconic acid, is said to be about three and a half times weaker than morphine, but in suitable doses produces a more prolonged effect and is freer from side actions. Klaus[1] has used it in **Midwifery** in about ninety cases. A single injection of 0·03 gram was usually sufficient to relieve the pain of labour satisfactorily. In a few cases of primiparæ, or when the labour was protracted, a second injection was required. The sedative action was fairly regular, appearing in about fifteen minutes. The pains are still perceived but are much less painful, and often a slight drowsiness is produced. In a few instances the uterine

contractions become feebler. In about 3·3 per cent of the cases the children were slightly asphyxiated at birth, but this proportion is distinctly less than that seen after the use of omnopon.

REFERENCE.—[1]*Münch. med. Woch.* 1914, 186.

NEOSALVARSAN. (*See also* SALVARSAN).

Neumayer states that neosalvarsan does not dissolve in blood, but Schubert[1] finds that at least 0·15 gram will dissolve in 1 c.c. of serum. He has administered the drug intravenously, dissolved in the patient's own serum, and states that in this way all water and saline 'errors' are eliminated, and the solvent is sterile. He claims that patients injected with neosalvarsan dissolved in their own serum show less reaction than when it is given in any other solvent. Most authorities now advise the intravenous injection of concentrated neosalvarsan solutions. Rühl[2] on theoretical grounds advises the older infusion method, as he thinks that thereby the neosalvarsan is more uniformly distributed through the tissues. Wechselmann and Eicke[3] say the subcutaneous route can be used for neosalvarsan. Their experience amounts to some 1000 injections, and they state that if the injection is made into the subcutaneous connective tissue it is quite painless and rapidly absorbed. The epifascial connective tissue is the proper place to insert the injection. They now use a fairly concentrated solution, dissolving 0·3 to 0·45 gram neosalvarsan in ½ c.c. of hot 0·7 per cent saline solution. In their practice 93 per cent of the injections are practically free from discomfort.

Wechselmann is one of the few who do not combine neosalvarsan with mercurial treatment. He does not believe in the combined treatment. To obtain a clear notion of the therapeutic activity of neosalvarsan he has investigated carefully a number of untreated fresh cases of **Syphilis** in which infection has not lasted longer than three months. In 100 cases examined serologically each week, they obtained a negative Wassermann reaction in the 42 which completed the cure of four to six weeks. The remainder did not complete the cure. They conclude that four to six weeks' treatment with neosalvarsan alone is able to make fresh syphilitic cases negative to Wassermann's reaction. The average treatment lasted thirty-seven days, and on an average 1·8 gram salvarsan and 1 gram neosalvarsan were used. They ascribe the chief therapeutic activity to the neosalvarsan, as in cases treated only with this quantity of neosalvarsan, without any salvarsan, the negative stage was as rapidly reached.

Seyffarth[4] uses a very concentrated solution of neosalvarsan for intravenous injection, as he dissolves the dose, even if 0·9 gram, in 2 c.c. of water. Great care must be taken to avoid any of the concentrated fluid escaping into the subcutaneous tissue, as it causes painful infiltrations, which take a long time to disappear. Ravaut,[5] in order to avoid this difficulty, advises that the dose should never be dissolved in less than 5–8 c.c. of water. He expressly states that in fresh or old untreated syphilities the first intravenous injection is

as a rule followed by a febrile reaction, but on subsequent injections absence of fever is the rule. Kerl[6] also noted the association of febrile reaction after the first injection only, but states that with concentrated solutions the fever develops more slowly than with diluted infusions. In the latter case the fever is usually present on the same day, whereas in the former it frequently does not appear till the next day. Katz[7] thinks that the concentrated solution acts more rapidly upon the spirochætes than the dilute infusion. Frühwald[8] states that in two-thirds of his cases the first injection of concentrated neosalvarsan was followed by fever, headache, vomiting, and diarrhœa. The second injection provoked much less disturbance, but after the third injection the reactions became more numerous again.

Dommisse[9] reports a case in which he administered 0·9 gr. neosalvarsan in 30 min. water to a patient suffering from early secondary syphilis. Within five minutes a severe rigor lasting two hours commenced, and six hours later there was well-marked left facial paralysis which gradually passed away. Hagerty[10] had a still more unpleasant experience. His patient, a man, age 29, had been infected with syphilis five years before. He was treated with mercury and potassium iodide for over two years. On account of ocular troubles he was treated with neosalvarsan. The first injection of 0·6 gram produced no reaction. The second injection, given over six weeks later, produced within half an hour collapse, congestion of face, difficult respiration, fast pulse, unconsciousness, and convulsions. He recovered sufficiently to walk to the ambulance, and seemed fairly well for the next five hours, when he died suddenly, without premonitory symptoms, from failure of heart and respiration. Post mortem, acute congestion of brain, lungs, stomach, and of all parenchymatous and ductless glands was found.

In a book published in 1913, Mentberger collected 274 cases in which the administration of salvarsan or neosalvarsan was supposed to have caused death. These figures have been severely criticised by Schmitt[11] and Benario,[12] who point out that several cases have been counted twice. In a great many the connection between the drug and death is very doubtful, and in some instances far too long a period of time had elapsed to warrant us in suspecting salvarsan. Both critics note that at first the reports of fatalities were much more numerous than at the present, and they state that many of the older accidents were directly traceable to the neglect of proper precautions either in technique or the selection of cases.

References.—[1]*Münch. med. Woch.* 1913, 2911 ; [2]*Ibid.* 1914, 1221 ; [3]*Ibid.* 535 ; [4]*Ibid.* 541 ; [5]*Presse Méd.* 1913, 867 ; [6]*Wien. klin. Woch.* 1913, 2076 ; [7]*Münch. med. Woch.* 1913, 2337 ; [8]*Ibid.* 2512 ; [9]*S. Afric. Med. Rec.* 1913, 393 ; [10]*Jour. Amer. Med. Assoc.* 1913, ii, 1294 ; [11]*Münch. med. Woch.* 1914, 1337 and 1396 ; [12]*Deut. med. Woch.* 1914, 1262.

NOVIFORM.

Speck[1] warmly recommends this antiseptic as an improvement on iodoform. Chemically considered, noviform is tetrabrombenzcatechinbismuth oxide. It is a very fine, odourless, stable powder, which

can be sterilized by heat. It is used clinically as impregnated gauze and in ointments and suppositories. Speck states that the powder does not irritate wounded surfaces, and is a useful **Antiseptic.**

REFERENCE.—[1]*Münch. med. Woch.* 1913, 1881.

OMNOPON.

Williamson and Joseph,[1] after an extensive trial of omnopon in over 500 cases, come to the following conclusions. Omnopon is fixed and unvarying in composition. It is of great value in those cases of advanced **Pulmonary Tuberculosis** when palliative treatment is alone possible. In this class of sufferer, with incessant cough, drenching night-sweats, sleepless nights, dissatisfied with his medicine and food, and discontented with everything around him, omnopon comes as a great boon. It is most valuable in relieving the pain of **Malignant Disease**, and may frequently be used as a substitute for morphia. It is less apt to constipate, and does not upset the appetite or cause so much nausea as morphia. Patients do not become readily tolerant of the drug, and on stopping its administration no troublesome symptoms arise, so that there is less dread of setting up a habit.

REFERENCE.—[1]*Med. Press and Circ.* 1913, ii, 321.

ORTIZON.

This drug is a combination of urea and hydrogen peroxide. It is readily soluble in water. Commercially the drug is supplied in three forms: a granulated form for preparing fresh hydrogen peroxide solution; tablets for extemporaneous preparation of mouth-washes, gargles, etc.; and in a solid form as a local application to fistulæ, sinuses, etc. Trümmer[1] states that ortizon has been employed in Prof. Seifert's clinic for three years, and is in daily use for preparing peroxide solutions for use in all types of **Mouth and Throat** conditions. The solutions are freely used to disinfect and cleanse the cavities of the nose and mouth, and local **Hæmorrhage** may be checked by the use of a douche. The solid pencils are very useful as mild caustics in cases of small **Ulcers in the Mouth.**

REFERENCE.—[1]*Münch. med. Woch.* 1913, 2565.

OVARIAN EXTRACT.

Iscovesco[1] has isolated a lipoid body from the fresh ovary which he states has a definite physiological and therapeutic action. There are several lipoid bodies contained in the ovaries, but the one in question is the alcohol-soluble substance obtained as follows. The ovaries are treated with alcohol, dried and powdered, and then extracted successively with acetone, ether, and chloroform. Finally there is left an extract soluble in alcohol, insoluble in acetone, soluble in ether and petroleum ether. From this appears to be prepared the portion used by Iscovesco. It is non-toxic for guinea-pigs, dogs, and rabbits. If given for long periods in large doses it causes increased growth of the uterus and ovaries. Iscovesco believes that this is an instance of homo-stimulant action, in which the organ from which the extract is derived

is stimulated by long-continued administration, resulting in hypertrophy. In the belief that in smaller doses there will be merely an increased functioning of the uterus and ovary, he has administered the extract to women suffering from apparent deficient activity of the ovaries. According to him, brilliant therapeutic results are obtained in **Irregular Menstruation,** whether delayed in onset or too profuse in flow, or of the dysmenorrhœic type. In hypofunction of the ovaries, as in chlorotic cases, it acts well, as also in both artificial and natural **Menopause** disturbance. From the corpus luteum he has isolated a similar lipoid body of identical action. As a rule he injects the drug in the form of an oily solution containing 1 to 2 per cent, and usually an injection either daily or on alternate days is sufficient. (*See also* CORPUS LUTEUM.)

REFERENCE.—[1]*Rev. de Gynécol.* 1914, 161.

OXYGEN, PEROXIDE OF HYDROGEN, OZONE.

Finch[1] has investigated the bactericidal properties of oxygen. Even in 95 per cent strength it does not kill or inhibit the growth in moist state of *Streptococcus brevis* or *B. coli* ; but under certain conditions it may inhibit, but not kill, the tubercle bacillus. In the absence of organic matter after prolonged contact, it may inhibit and even kill the auricoccus. Hydrogen peroxide (U.S.P. 3 per cent) is an active bactericide for all four micro-organisms tested, but the action is dependent on the amount used, the age and strength of the preparation, and the absence of organic readily oxidizable matter. Ozone under certain conditions is an active bactericide for organisms suspended in water or fluid media ; but as it does not dissolve in water, it requires to be continuously passed in a fine stream of bubbles to produce the bactericidal effect.

REFERENCE.—[1]*N. Y. Med. Jour.* 1913, ii, 1066.

PAPAVERINE.

Pal[1] states that this alkaloid is possessed of properties different from those of the other opium alkaloids. It is a fairly powerful local anæsthetic, which may possibly explain the persistent use of opium solutions as local anodynes. On the smooth muscle tissue of the vessels papaverine acts as a paralyzer, so that the blood-pressure falls. The action is a peripheral one on the muscle tissue, and in normal conditions the fall induced is only trifling ; but in pathological states, where there is high tension, the fall is much more marked. Papaverine antagonizes all pressor substances hitherto investigated. In excessive dose the heart may cease to beat, the left ventricle stopping in systole, while the right heart is still beating. The vessels of the lungs are dilated. Papaverine is not a narcotic, nor does it produce constipation. Pal has used the drug in cases of **High Arterial Tension,** and finds that this is an efficient method of reducing arterial pressure, especially if due to arterial spasm. It is least effective when the rise is due to structural changes in the arterial walls. Clinically

there are two difficulties to overcome: the proper dosage, and the fact that rapid repetition of the administration reduces the effect. As first dose he has not exceeded 0·06 gram orally or subcutaneously, and 0·01 gram intravenously. He has had excellent results in **Uræmic** conditions, **Angina Pectoris,** and in cases of **Cerebral Congestion.** In treating anginous attacks he prefers papaverine to amyl nitrite, as it causes less discomfort to the patient. If a day or two elapse between the doses, the drug does not lose its effect. It may be used instead of the nitrite in the treatment of **Hæmoptysis.**

REFERENCE.—[1]*Deut. med. Woch.* 1914, 164.

PARACODEIN.

This preparation (dihydrocodein) is apparently useful as a drug to allay **Cough.** Wentzel[1] believes that it lies midway between morphine and codeine in activity. It relieves cough, but also possesses some effect as a general sedative. The drug does not cause constipation or stimulate the cerebrum. It is not likely to lose its action even if the administration is maintained for a considerable period. He finds it of some use in the treatment of **Morphinomania.**

REFERENCE.—[1]*Berl. klin. Woch.* 1914, 603.

PHENOVAL.

According to the makers, this is a bromisovalerylparaphenetidin —a combination of phenacetin and bromisovalerianic acid. In animal experiments it proved to be very feebly toxic. Salomon,[1] who has used the drug extensively, states that it is very useful in the treatment of **Headache,** especially in chlorotic and anæmic girls. In some patients the drug causes slight sleepiness, and in doses of 1 gram is a mild hypnotic. It is insoluble and tasteless. It is not likely to upset the digestion, and does not readily lose its action, even if continually administered for a couple of weeks.

REFERENCE.—[1]*Berl. klin. Woch.* 1914, 935.

PHOSPHORUS.

Lemon,[1] after an extended use of phosphorus lasting over eleven years, warmly recommends its use in the treatment of **Pulmonary Disease.** It is very useful in pulmonary **Tuberculosis,** even when the disease is at an advanced stage. As a rule the phosphorus treatment increased the sputum for the first four to eight weeks, depending on the severity of the case. Thus, in early cases, the increase lasts for about fourteen days, but in advanced cases it may last for ten weeks or longer. Usually about the sixth week in an average case the sputum rapidly diminishes, and cough becomes harder. From this time on, the sputum rapidly diminishes till it ceases, the cough becoming harder and harder till it is the only symptom left. At the later stage some hæmorrhages may occur from slight rupture of the healing surfaces through the hard coughing. The general condition seems to improve also, and the patients increase in weight. Phosphorus is

apparently also useful in acute and chronic **Bronchitis** and in **Pneumonia.** In phthisical cases he often combines phosphorus with arsenic, calcium, and iodine, the combination usually employed being :

℞ Calcii Hypophosphitis		Syr. Ferri Iodidi	℥ss–j
Tinct Phosphori (1–1000)		Aq.	ad ℥vj
Liq. Arsen. Iodidi	āā ℥ss–ij		

Dessertspoonful four times a day after meals.

In acute pneumonia he uses the following prescription :—

℞ Tinct. Phosphori	℥ss–j	Spt. Æth. Nit.	℥ss
Liq. Ammon. Acet.	℥j	Aq.	ad ℥vj

Dessertspoonful hourly for six hours. Then six doses every two hours, and finally every three hours till the crisis.

Reference.—[1]*N. Y. Med. Jour.* 1913, ii, 320.

PHYLACOGENS.

Hill,[1] Flett,[2] and Gilruth[3] all publish papers in which the value of phylacogen treatment, chiefly in **Chronic Rheumatism,** is emphasized. In a discussion at San Francisco many physicians recorded their belief in its efficacy. The most important contributions, as based on the largest clinical experience, were the papers of Coffey,[4] Alden,[5] and Artiques.[6] Certain slight differences in technique were noted. Coffey regulates the dose by the effect on pulse, temperature, and respiration. He prefers to give the initial dose when the temperature is at the lowest point of oscillation. A rise in temperature soon occurs, followed in a short time by a drop. The rise indicates that the patient can make a response to treatment, and the nearer the subsequent fall is to normal, the greater has been the gain. A rise in pulse-rate with subsequent fall is of similar import. On the other hand, Alden employs the leucocytic response as his guide. The injection is followed by a short leucopenia with succeeding leucocytosis, the differential count showing an increase in polymorphs. Within twenty-four hours the blood-count returns to its original state, and then a second injection can be given. Artiques seems to favour the control of the dosage by the effect on the pulse. All these three writers appear to have had very extensive experience of phylacogens, and they believe in their therapeutic efficacy. Whereas in this country the usual method of administration is by the subcutaneous route, Coffey, Alden, and Artiques use the intravenous method. The subcutaneous injections cause more local pain and produce less therapeutic response. Alden states that he is now using smaller doses than formerly, and as an initial dose he gives from 5 to 10 min. diluted with forty volumes of 0·9 per cent salt solution. This dilution does not hæmolyze the blood, and does not cause the severe rigor seen after larger doses. As regards the value of phylacogen treatment in gonorrhœa, he is rather doubtful. Artiques considers phylacogens highly efficient therapeutic agents in **Typhoid Fever** and in **Erysipelas,** while Coffey states that their value is perhaps best seen in **Surgical Infections,** though he finds them

extremely valuable also in many other diseased conditions depending on bacterial infection.

REFERENCES.—[1]*West Canada Med. Jour.* 1913, ii, 435 ; [2]*Pract.* 1913, i, 726 ; [3]*Med. Press and Circ.* 1914, i, 199 ; [4]*Ther. Gaz.* 1913, 837 ; [5]*Ibid.* 847 ; [6]*Ibid.* 850.

PITUITARY EXTRACT.

On examining six separate commercial preparations of pituitrin on the American market, Roth[1] found wide variability in the pharmacological activity. His tests consisted of the effect of intravenous injection on the blood-pressure of dogs, and the effect on the virgin uterus of the guinea-pig. The blood-pressure test showed a wider range of variability than does the virgin uterus test, and is not applicable for all preparations.

Jayle[2] warmly recommends the hypodermic use of extract of the posterior lobe in gynæcological cases. Using doses every second day, rising progressively from one-eighth to half a normal gland, he states the immediate results are very favourable. There is no local reaction, but the injections make the patients paler, and there may be some lassitude. There is often some colic and headache, and the first night may be sleepless. The uterine and vaginal discharges are lessened, abdominal discomfort and pain are often diminished, constipation is removed, and there is a disappearance of the vague rheumatic pain in the limbs. The periods become less profuse, sometimes they are slightly advanced, in other cases they are merely made more regular. He is unable to state what the final results of pituitrin treatment are, but the immediate results are so satisfactory that he warmly recommends a trial of the injections in such cases as **Metritis, Salpingo-ovaritis, Pelvi-peritonitis, Metrorrhagia,** hæmorrhage from **Malignant Disease,** etc. As a rule it will eventually be found that about one injection every five or six days is sufficient to maintain the improvement.

Titcombe[3] points out that the anterior lobe probably has an important influence on the rate of bodily growth. Accordingly he has investigated the effect of administration of this part of the gland on metabolism as indicated by changes in the urine of the human subject, including patients suffering from cancer. Administration of the extract of the anterior lobe by the mouth is unsatisfactory, as it interferes with digestion and absorption, but if given intramuscularly or subcutaneously no such disturbance results. Alike in cancer and non-cancer patients it causes an increased excretion of phosphorus and calcium, an increased total acidity, and a decreased excretion of purins. These changes are said to indicate influence on bone and body fluids, which may possibly be of benefit to **Cancer** patients. At any rate, three out of four patients showed a decided improvement in general health during the treatment. In no case was the rate of growth of the tumour affected. In the human subject, injection of the extract causes a fall in blood-pressure, especially following the first injection.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 476 ; [2]*Presse Méd.* 1914, 245 ; [3]*Med. Chron.* 1914, 371.

POTATO.

According to Howard,[1] the external application of concentrated potato juice is a valuable remedy in the treatment of **Synovitis, Gout, Lumbago,** and other **Rheumatic Affections.** The fresh raw potatoes are subjected to hydraulic pressure, the starch and nitrogenous matter removed, the fluid is concentrated to one-fifth by heat, and glycerin added. The resulting ' ext. solani liquidum ' is used in various ways : as a poultice or fomentation ; one part extract to three or four parts hot water applied on lint covered with protective, cotton-wool, and bandage. The fomentation is renewed every two, three, or four hours. It is also used as an ointment or liniment (either equal parts of the extract with lin. saponis co., or two parts of extract to three parts of lin. saponis co.). According to the author, in acute joint conditions the application of the extract gives rapid relief to pain, and causes the absorption of any effusion in four to six days. One or two days' application of the ointment removes thickening of the synovial membrane. He does not claim that potato juice cures the constitutional symptoms, but local application gives more rapid relief of pain than any other method of treatment, local or internal, at present used.

Reference.—[1]*Lancet,* 1914, i, 1035.

QUININE.

Roger Brooke[1] states that quinine is a useful alternate remedy in place of emetine in refractory cases of **Dysentery.** Though its amœbicidal action *in vitro* is only one-fifth that of emetine, it acts fairly satisfactorily in cases of dysentery which prove resistant to ipecacuanha or emetine.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 1009.

RIOPAN.

This preparation is stated to represent the full therapeutic activity of Rio ipecacuanha in a stable, easily administered form. It is a fine brown powder, readily soluble in water. The ipecacuanha alkaloids in the form of hydrochlorides constitute half of riopan, the remaining half consisting of the other valuable non-alkaloidal constituents, notably ipecacuanhic acid. In concentrated watery solution riopan forms a clear fluid, but in weak solutions (2 per cent and less) there is a flocculent precipitate. Grabs[1] has tested the expectorant properties of riopan to determine whether it can be used instead of the official preparations of ipecacuanha. He states that 10 to 15 min. thrice daily of a 0·5 per cent solution proved to be emetic in action, but a solution of one part of riopan in 1200 parts of water is an excellent expectorant in doses of three to five teaspoonfuls daily. Simple tablets act well, but are apt to make the throat rough ; trochisci with a tragacanth basis are better borne and act as efficient expectorants.

Reference.—[1]*Deut. med. Woch.* 1913, 2146.

SALINE SOLUTION.

Litchfield[1] points out that the use of saline solutions either by enteroclysis, hypodermoclysis, or intravenous injections is not without some danger. Too much fluid may overtax the heart, and too much sodium chloride may damage the kidneys. While recognizing the beneficial effects of artificial sera in increasing the blood-serum in certain surgical conditions, and removing poisons, stimulating diuresis and cardiac action, he points out that he sees no justification for the use of sodium chloride except in cases of chloride starvation. Instead of the toxic sodium chloride he prefers glucose, which is harmless, and at the same time provides food to the body. To relieve thirst he gives water by the mouth or isotonic 5·1 per cent glucose by the rectum. The glucose solution is preferable where there is acidosis or inanition. When there is a distinct indication for an artificial addition to the amount of circulating blood-serum, this may best be accomplished by the use of dextrose solution : isotonic (5·1 per cent) by enteroclysis ; isotonic, hypertonic (up to 30 per cent), or hypotonic (2 per cent) by intravenous infusion. There are no contra-indications for the use of dextrose solutions, but the water used for intravenous infusion must be not only sterile but non-toxic. In medical practice artificial serums should be more frequently used : (1) Isotonic or hypotonic after severe **Hæmorrhage,** exhaustive **Vomiting** or **Diarrhœa**, inanition ; (2) Hypertonic in toxæmic cases, **Uræmia, Eclampsia,** oliguria with threatened uræmia, to combat **Acidosis,** and toxic states after drug poisoning or inhalation of anæsthetics and gas.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 307.

SALVARSAN. (*See also* Neosalvarsan ; Syphilis.)

Kohrs[1] reports a fresh case of death from *acute encephalitis* after intravenous administration of 0·6 gr. salvarsan. The symptoms do not differ markedly from those seen in similar cases. Post mortem, the pons showed in its upper portion thickening, reddish discoloration, and softening. Microscopically, here, and in parts of the brain which macroscopically seemed healthy, there was well-marked hæmorrhagic encephalitis. Kohrs thinks that these cases depend not upon a previous syphilitic injury, but are really instances of a vasoparalytic action due to the toxic action of arsenic. In this connection it is interesting to note that Lube[2] has reported a case of acute arsenic intoxication after salvarsan administration in a patient who was not suffering from syphilis. The patient, a woman, age 50, had an enlarged heart with basal and apical murmurs. The Wassermann reaction was negative, and she denied any venereal infection, but in view of the fact that out of nine pregnancies the last five had resulted in abortion, it was decided that she should receive salvarsan treatment. In the course of nine days three injections of salvarsan were given, without any disturbing symptoms at first ; but seven days after the last injection she suddenly began to complain of abdominal pain and profuse diarrhœa, blood in the stools, and vomiting. Two days

later she succumbed. In the last twenty-four hours she became jaundiced, and had albumin and casts in the urine. Post mortem, a diffuse hæmorrhagic, necrotic, diphtheroid enteritis was discovered, perforation of the stomach, fatty degeneration of the liver, and nephritis. Chemical examination showed that the brain contained 1·9 mgrams, liver 4·8 mgrams, and kidneys 8·44 mgrams of arsenic. Thus by far the greatest quantity of arsenic was found in the kidneys and liver. The brain macroscopically was normal, and during life no cerebral symptoms were noted.

Ehrlich's[3] explanation of the etiology of salvarsan *hæmorrhagic meningitis* is well known. He has restated it recently. The origin is extremely complex. He recognizes as one factor the presence of syphilitic processes in the meninges and capillaries of the brain containing spirochætes, and says that the liberation of endotoxins through destruction of the latter causes certain alterations which only find expression after an incubation of several days. The essential point in hæmorrhagic encephalitis is the colossal dilatation of the vessels, leading later to œdema and perivascular bleeding. The fact that the dilatation comes on late shows, in Ehrlich's view, that the actual cause is not unaltered salvarsan but some reduction form, probably paraminophenylarsenoxide. A third factor is associated with adrenalin. He thinks that the colossal vascular dilatation points to an absence of adrenalin, and points out that after Schridde had noted caseous degeneration of the suprarenals in three fatal cases, Milian, of Paris, showed that the early vascular disturbances sometimes immediately following salvarsan treatment are removed entirely by administration of adrenalin. Similarly in encephalitis hæmorrhagica, adrenalin has given good results to Milian, Pinkus, and Fiocco. Fiocco's case is especially interesting. The patient recovered from deep coma after four injections of adrenalin, only to relapse twenty-four hours later, when he again responded to adrenalin.

Heinrichsdorff[4] reports his third case of *liver degeneration* due to salvarsan, the essential lesion being a central hæmorrhagic necrosis of the lobules.

The investigations of Jeanselme, Vernes, Bertrand, and Bloch,[5] show that the distribution of arsenic in the internal organs is very variable. After intravenous injections of salvarsan in one case the greatest quantity of arsenic is found in the spleen, in others in the liver or lungs. They are quite unable to explain this. They note, however, that where the kidneys are diseased, they contain abnormally large quantities of arsenic, probably owing to defective elimination.

Stühmer[6] has investigated the questions: (1) How long, after an intravenous injection, therapeutically active bodies remain in the blood-serum? and (2) Whether these bodies are simply portions of the drug, or of the nature of specific antibodies. In his experiments he used rabbits infected with nagana trypanosomes. His general conclusion is that after a single intravenous injection of

salvarsan it is still possible, after seven days, to demonstrate by chemical and experimental tests the presence of active bodies in the blood-serum. It is almost certain we have to do with oxidation products of salvarsan, and not with salvarsan itself. He subsequently contrasted the effects of neosalvarsan, salvarsan, and joha. The serum loses its protective action sooner after neosalvarsan than salvarsan. The serum gave the same curves if the drugs in aqueous solution are administered intravenously; but if the salvarsan is injected in an oily suspension into the muscular tissue, no protective bodies appear in the serum.

Robertson[7] has investigated the *local histological changes* produced by injection of salvarsan and neosalvarsan into the muscles. Hæmorrhage, necroses, and œdema result almost immediately after the injection. Leucocytes early invade the part and form a zone round the necrotic area. An insoluble yellow pigment remains, and acts in every case as a comparatively inert foreign body. Both salvarsan and neosalvarsan produce, on intramuscular injection, severe destructive lesions, healing slowly and often complicated by hæmorrhages and sloughing abscesses. The severity of the reaction is essentially the same for both drugs. On account of its severe nature he thinks it inadvisable to administer these drugs intramuscularly.

Buberl[8] reports the successful employment of salvarsan in a case of **Malignant Pustule** of the face. The diagnosis of anthrax was confirmed bacteriologically. After injecting 0·6 gram intravenously a rapid improvement in the general condition appeared, while the local signs slowly resolved.

J. D. Rolleston[9] reeords a case of **Vincent's Angina,** which had proved refractory to local treatment with tincture of iodine, methylene blue, etc., but which improved very rapidly on the local application of salvarsan powder. A throat swab moistened with glycerin was dipped in the salvarsan powder and rubbed all over the affected area.

Klotz[10] puts in a plea for the use of oily injections of salvarsan. They are more economical for the patient, and more easily administered. Properly given they cause no more disturbance than the injection of insoluble mercurial preparations.

Dreyfus[11] warmly recommends the use of concentrated intravenous injections of salvarsan. He dissolves 0·1 to 0·4 gram of salvarsan in 20 c.c. double-distilled water, neutralizes with 15 per cent caustic soda, makes bulk up to 40 c.c., and injects the solution slowly into a vein. He states that the use of the smaller quantity of water reduces the risk of fever or general disturbance. It will be noted that the strength of the solution he uses is never more than 1·25 per cent. He estimates that with 30 c.c. of fluid in the syringe, and the quantity in the rubber tube joining the needle, there is in all about 38 c.c. fluid in which the salvarsan is dissolved. He has never seen any serious irritation of the kidney follow the injection, and in most cases absolutely no local trouble in the vein is produced, so that the same vein may be used for several injections.

Salvarsan-Copper.—This complex combination has been discovered by Ehrlich and Karrer. The latter has shown that the copper is directly combined with the arsenic, and is not merely attached to the amidophenol portion. Baermann[12] has been supplied with the new drug to test its activity in tropical diseases. As the supply available was limited he was only able to test it in a comparatively small series of cases. Briefly summarized, his results in **Amœbic Dysentery** were bad, but in **Frambœsia** the drug is exceedingly potent, a single intravenous injection of 0·1 gram producing rapid symptomatic improvement, lesions clearing up, spirochætes disappearing, and the Wassermann reaction turning from positive to negative. In a number of cases, however, the serum soon became positive again. In Baermann's opinion salvarsan-copper is more active than salvarsan. In **Leprosy** the single test case gave promising results. In **Malaria** the therapeutic results were distinctly encouraging. In a limited number of quartan and tertian cases, in which the drug was used, the parasites are distinctly diminished in two hours, and in twenty-four hours are almost entirely gone from the peripheral blood. The temperature falls soon after the injection, and remains permanently normal. In pernicious forms, showing young gametes and crescents, either primarily or later the injection is followed by a permanent fall of temperature, as the schyzonts are either destroyed or severely damaged, though progametes and gametes are resistant.

The administration of the new drug is rather difficult. It is dissolved in the ampoule with the addition of 0·65 c.c. of double normal caustic soda. This is then diluted with a 0·7 per cent sodium chloride in 1 per cent sugar solution up to 50 c.c., which gives a clear, dark olive, greenish-brown solution. Unless the directions are carefully followed the solution forms a flocculent precipitate.

References.—[1]*Münch. med. Woch.* 1914, 368 ; [2]*Deut. med. Woch.* 1914. 946 ; [3]*Brit. Med. Jour.* 1914, i, 1044 ; [4]*Berl. klin. Woch.* 1913, 2283 ; [5]*Presse Méd.* 1913, 857 ; [6]*Münch. med. Woch.* 1914, 745 and 1101 ; [7]*Jour. Amer. Med. Assoc.* 1913, ii, 1698 ; [8]*Münch. med. Woch.* 1914, 1339 ; [9]*Pract.* 1913, ii, 847 ; [10]*N. Y. Med. Jour.* 1913, ii, 865 ; [11]*Münch. med. Woch.* 1913, 2333 ; [12]*Ibid.* 1914, i.

SENNATIN.

This preparation of senna leaves is said to contain all the active constituents, while the inactive material has been removed. It is a dark, clear, stable, and sterile fluid, intended to be administered by intramuscular injection. The ordinary dose of 2 c.c. costs about 2½d. Credé[1] used it in 300 cases of **Constipation** of all types, with successful results—even in cases of meteorism and paralysis of the bowel. Ebeler[2] and Drews[3] have used it after gynæcological operations, and state that it is a useful prophylactic against **Post-operation Atony of the Bowel**. The peristalsis begins in three to six hours, and flatus is passed soon afterwards. It is stated that the drug produces a lasting action in habitual constipation, so that a regular action of the bowels may be noted for several days. Lindbom[4] tested the

drug in medical cases. Out of 50 cases 10 showed no response. In 40 cases peristalsis and expulsion of intestinal gas occurred, and in 16 spontaneous fæcal evacuations. He concludes that in 80 per cent of the cases an effect upon peristalsis was obtained. He notes that in many instances when spontaneous evacuations did not occur, the aid of a small enema resulted in very satisfactory evacuation of the bowels. Lindbom noted in several cases that the intramuscular injections caused a transitory febrile disturbance. A lasting beneficial effect of the drug was seen in about 28 per cent of his cases.

REFERENCES.—[1]*Münch. med. Woch.* 1912, No. 52 ; [2]*Med. klin.* 1913, No. 37 ; [3]*Deut. med. Woch.* 1914, 497 ; [4]*Münch. med. Woch.* 1914, 872.

SOPHOL.

Sophol is a silver compound of formaldehyde and nucleinic acid, which has been warmly recommended as a reliable preparation for **Ophthalmic** purposes. Zade and Barczinski[1] have investigated its antiseptic properties. Clinically they consider sophol a useful silver preparation in **Gonococcal Blennorrhœa,** at first along with silver nitrate solutions, but alone in the later stages.

REFERENCE.—[1]*Deut. med. Woch.* 1914, 647.

STEROLIN.

This substance is prepared as follows: Balsam of Peru, 4 grams; castor oil and Venetian turpentine, of each 2 grams ; glycerin, 1 gram ; spirits of wine, 100 grams. It is a brownish-yellow fluid, which is not sticky, and does not irritate or stain the hands. Frank[1] uses sterolin with or without iodine as a means of **Disinfecting the Skin** for surgical operations. The original intention was to find out a preparation suitable for war surgery where pure water could not be obtained. An extensive experience with sterolin in times of peace leads him to think that it will be valuable in war-time. Without any other preliminary treatment than shaving the part, sterolin on sterile gauze is rubbed on the site of the operation for one or two minutes and then allowed to dry, during which time the arms and hands of the operator may be similarly treated with sterolin. Then a second application is made to the patient's skin, and the operator's hands are again moistened with it. As soon as they are dry the operation can begin. Recently he has modified his procedure somewhat. He commences by painting the site of operation with 6·6 per cent tincture of iodine. While this is drying, the hands of the operator are prepared with sterolin swabs. Then the patient's skin is washed with sterolin swabs till the iodine stain is removed, which indicates the degree of sterilization required. The hands are again mopped with sterolin and allowed to dry, and then the operation is performed. Washing with soap and water is entirely given up. The theory is that the swabbing mechanically removes the superficial germs, and the film formed on evaporation of the sterolin prevents those in the deeper layers of the skin from becoming free.

REFERENCE.—[1]*Centr. f. Chir.* 1914, 1249.

TARTRATES.

In rabbits and dogs a nephritis involving the tubular epithelium may be produced by the subcutaneous or oral administration of tartrates. To produce nephritic changes the quantity given by the mouth requires to be very large—8 grams of Rochelle salt to a fasting rabbit weighing 1660 grams proved fatal, and 5 grams to one of 1480 grams produced granular degeneration of the epithelium of tubules. Post[1] has investigated whether tartrates are similarly injurious in human subjects. His results bear out the ordinary experience of clinicians, that potassium and sodium tartrates in ordinary doses given by the mouth produce neither albuminuria nor cylindruria, and do not aggravate an existing nephritis. The acidity of the urine is, if anything, diminished by the administration of tartrates.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 592.

TESTI-IODYL.

This organic compound of iodine and iron is intended for internal use in cases of chronic illness where there is a degree of anæmia and at the same time a necessity for iodine treatment. It appears that testi-iodyl is a blood-iodine compound in which all the albumin bodies of the blood, except fibrin, are present. It is stated to contain 81·48 per cent albumin, 15·24 per cent iodine, and 0·25 per cent iron. Wohlgemuth and Rewald[1] state that in rabbits the preparation is well borne and is not irritating to the gastro-intestinal tract. The iodine is absorbed and largely excreted in the urine. Blumenthal[2] has tested the therapeutic activity of the new drug in twenty-two cases, giving it in the form of tablets made up with chocolate. The drug was well borne, did not upset digestion, and was successfully exhibited in cases of **Arteriosclerosis, Chronic Bronchitis, Chronic Rheumatism,** and **Myocarditis,** when the patients were also showing signs of anæmia.

REFERENCES.—[1]*Biochem. Zeits.* lv. H. 1 and 2; [2]*Deut. med. Woch.* 1914, 108.

THYMIN.

Hirsch[1] has employed this preparation of thymus gland with some success in twelve cases of **Exophthalmic Goitre.** He states that thymin is also of value as a hypnotic agent, and induces sleep in some **Neurasthenic Arteriosclerotic** patients. Thymin is stated to be an evaporated albumin-free watery extract of fresh thymus of calves.

REFERENCE.—[1]*Deut. med. Woch.* 1913, 2141.

UTERAMINE.

This preparation is apparently the hydrochloride of para-oxy-phenylethylamine, similar to the drug known in this country as tyramine. Lauffs[1] states that the subcutaneous injection of 1 c.c. of a 2 per cent solution rapidly checks **Nasal Hæmorrhages** occurring spontaneously or as the result of operative measures. It may also be

used as a tampon applied to the bleeding area. He further states that the prophylactic subcutaneous injection of the drug lessens hæmorrhage in intranasal operative work.

REFERENCE.—[1]*Deut. med. Woch.* 1913, 2252.

VACCINES.

There are distinct indications that the belief in vaccine therapy is on the wane. Horder,[1] in opening a discussion at the Royal Society of Medicine, pointed out that the present great use of vaccines was in part due to this remedy being fashionable, and that thereby the hand of the physician was forced. The failures of vaccine therapy are probably more numerous than its successes. Too much is probably expected of it. In some cases it is of unquestionable benefit, and he considered it a valuable addition to the physicians' powers, but this value depends on the care and judgement bestowed on the diagnostic problem. On the other hand, every attempt should be made to employ other therapeutic measures calculated to raise the general standard of health. Rolleston[2] confessed he was doubtful or open-minded about the value of vaccines. Curative vaccine treatment must be admitted to have disappointed the high hopes with which it began. This may be due to bad technique, faulty recognition of the causative organisms, or improper use of the vaccine. At the present time the results of treatment by vaccine are so uncertain that their use appears to be justified only when trustworthy therapeutic methods have failed or do not exist. Even when good results follow there is always the old question, "*Post hoc, propter hoc?*" Though many of the other speakers taking part in the discussion were more hopeful about the value of vaccine treatment, the President, in summing up the discussion, said that in acute infections, though strikingly favourable in a few instances, the results of vaccine therapy were disappointing in the majority of cases, and in some harm had resulted. In this country the use of vaccines was rather haphazard; there was no use of controls.

An even more damaging attack on vaccine therapy was made by Batty Shaw,[4] who pointed out the very marked absence of the use of controls in estimating its value. He stated that there is really no scientific evidence that the injection of vaccines has any curative effect in established disease. The vaccinists have neglected animal experiments. Undoubtedly the use of vaccines brings about changes in the blood and the production of antibodies, but no one has yet shown that any of the opsonins or other bacteriolysins produced are of therapeutic value. What proof is there that opsonins have a curative effect? The vaccinists are in many cases not clinicians. They do not know the natural course of the diseases they profess to treat, and ignore the possibility of spontaneous cures. The claim of the vaccinist that he is treating not the symptoms but the cause of the disease, is not established. No animal has ever been cured of an infection by vaccines. Vaccination probably does use up ambo-

ceptors provoked by infection, but hitherto there is no evidence forthcoming that vaccination *after* infection leads to the destruction of the micro-organisms which call these amboceptors into existence.

Instead of counting the number of organisms in a vaccine, Bruce[5] graduates by the opacity. The culture, emulsified with saline solution, is placed in a $\frac{5}{8}$-in. test-tube and diluted with saline solution till it is just possible to read clearly certain type through the medium of the tube containing the emulsion. As test type he uses the ordinary type of Muir and Ritchie's Handbook. The initial dose of such a diluted emulsion is in every case 0·1 c.c.

In a paper by Glynn and others[6] a new counting-chamber on the principle of the hæmocytometer is described. The main features are the smaller depth of fluid in the chamber (0·02 as against 0·1 mm.), a specially thin plane cover-slip, and an extra wide trench. By these features it is possible to use an ordinary oil-immersion lens for counting the organisms. As the most suitable stain, weak carbol thionin is recommended. They claim that this special hæmocytometer and stain give more accurate and speedy results than Wright's method.

Sensitized Vaccines.—Besredka[7] after reviewing recent work, comes to the conclusion that both test-tube and clinical experiments show that of all methods of vaccine therapy, either with dead or living organisms, the living sensitized organisms produce the maximum of useful antibodies in the shortest time and with the minimum of reaction. Several investigators have shown that both in human beings and in the lower animals the use of sensitized vaccines of living organisms produces less agglutinins in the serum than does non-sensitized vaccine, but the bactericidal properties of the serum are much more marked and last longer.

Schumacher[8] has tested the effect of intravenous administration of gonococcic vaccine in three cases of **Gonorrhœal Infection.** The therapeutic results are not more satisfactory than those obtained with intramuscular injections, and there is frequently a decided febrile reaction. (*See also* GONORRHŒA.)

The protective value of **Antityphoid Vaccination** is thoroughly demonstrated by the remarkable results obtained in the United States Army.[9] Up to 1909 it was a voluntary measure, but in 1911 it was made compulsory for all men under 45 years of age. In pre-vaccination times the best results are shown in the year 1908 with a total of 239 cases of typhoid, or a case incidence of 3·21 per thousand men. In 1913 there were only 3 cases of typhoid fever, equalling ·03 per thousand, though one-third of the 90,648 men comprising the army were employed outside the United States. There were no deaths.

Chantemesse[10] states that in the French army a monovalent vaccine killed by heating is employed as a prophylactic measure. Four injections are given. (*See also* TYPHOID FEVER.)

REFERENCES.—[1]*Lancet*, 1914, i, 310; [2]*Ibid.* 378; [3]*Ibid.* 384; [4]*Med. Chron.* 1913, Dec. 185; [5]*Lancet*, 1913, ii, 1760; [6]*Ibid.* 1914, i, 1028; [7]*Berl. klin. Woch.* 1914, 97; [8]*Deut. med. Woch.* 1913, 2147; [9]*Jour. Amer. Med. Assoc.* 1914, May 2; [10]*Amer Jour. Trop. Dis.* 1914, 720.

In a considerable number of cases, the official formula for making up galenical preparations has been revised, and it is to be hoped that improved preparations will be obtained. The changes are particularly noticeable in the case of the lozenges and ointments, where very material alterations in the basis have been made.

The changes which directly affect the medical man are the following: An alternative dosage in both imperial and metric systems has been adopted. The strength of many important galenical preparations has been materially altered, and in various cases new names have been given to old preparations. Many crude drugs and their preparations, which are no longer popular, have been discarded, and a limited number of newer drugs in current demand have been officially recognized.

An important change from the chemist's point of view is the discarding of the imperial system of weights and measures for compounding the official preparations. In the former issue the formulæ were given alternatively in both the imperial and metric systems, while the doses in which the drugs were to be administered were stated only in the imperial system. In the present issue, the metric scale is alone official for compounding the preparations, but the official doses are stated in both metric and imperial scales. The avowed object of this change is to facilitate the eventual entire abolition of the imperial system of weights and measures in prescribing. The present stage of alternate scales is not very likely to prove satisfactory. It is of course well recognized that the official doses are not obligatory, and may be exceeded or reduced at the discretion of the prescriber. In the attempt to facilitate the introduction of the metric system, the compilers have stated the doses as far as possible in whole numbers, and as the two sets of whole numbers do not agree accurately, there is a considerable difference in the amounts actually involved. In general, it may be stated that as regards fluids the metric doses when stated in mils exceed the imperial doses by about 12 per cent.

On the other hand, unless stated in grams, the metric doses of solids are in most cases about 8 per cent lower than the imperial doses. These discrepancies arise from the fact that whereas the mil (millilitre) is really equal to 16·9 minims, for purposes of equivalent dosage it is taken as equal to 15 minims; only a very slight discrepancy is introduced by taking six centimils as equivalent to one minim. For solids the unit is the gram, which is equal to 15·4323564 grains, but for convenience it is taken as equal to 15 grains, and one grain as equal to 6 centigrams. It is really equal to 6·48 Cg. The table of approximate equivalences adopted in stating doses in the B.P. on page 534 is curiously inconsistent; 30 minims is equal to both 18 decimils and 2 mils; 8 grains = 5 decigrams, 10 grains = 6 decigrams, 15 grains = 10 decigrams.

THE NEW BRITISH PHARMACOPŒIA, 1914.

By F. J. CHARTERIS, M.D.

The Medical Act of 1857 empowered the General Council to publish and amend a book containing a list of medicines and compounds, together with formulæ for preparing them, and the true weights and measures to be used by doctors and chemists. In issuing the British Pharmacopœia, full advantage has been taken of these powers, and the fifth edition differs in almost every page from the former (1898) edition. Intended to form one uniform standard and guide for medical men and pharmaceutical chemists, the B.P. is unequally divided in the degree in which it affects these two professional classes.

The great majority of the changes in the new issue are only of subsidiary importance to the medical man, and affect primarily the chemist. This arises from the circumstance that medical men seldom make up galenical preparations, and scarcely ever undertake such duties as checking the purity of drugs according to the B.P. standards.

The main pharmaceutical changes may be therefore dismissed comparatively summarily. It is evident that the compilers have aimed at supplying the medical man with purer drugs and improved preparations. Generally speaking, the tests for insuring the purity of drugs have been overhauled and made more stringent. The medical man will note with interest that these tests are still entirely chemical in their nature. No attempt has been made to introduce so-called physiological or animal standardization. For the first time, for a large number of drugs a definite limit is laid down to the amounts of lead and arsenic permitted as impurities, though these amounts show curious variations in different compounds of the same drug. In the same direction of greater purity are the more elaborate tests for both volatile and fixed oils. The chemical standardization of drugs containing important potent alkaloidal bodies has been extended, a chemical assay being prescribed in several cases, e.g., opium, nux vomica, aconite, quinine, belladonna, jalap, hydrastis, filix mas, and their galenical preparations. Of similar import is the abandoning of several crude drugs which are now represented only by active constituents, notably in the case of cantharides, coca leaves, jaborandi leaves, pomegranate root, and Calabar bean, which are now represented by their active principles from which galenical preparations are made.

In a considerable number of cases, the official formula for making up galenical preparations has been revised, and it is to be hoped that improved preparations will be obtained. The changes are particularly noticeable in the case of the lozenges and ointments, where very material alterations in the basis have been made.

The changes which directly affect the medical man are the following: An alternative dosage in both imperial and metric systems has been adopted. The strength of many important galenical preparations has been materially altered, and in various cases new names have been given to old preparations. Many crude drugs and their preparations, which are no longer popular, have been discarded, and a limited number of newer drugs in current demand have been officially recognized.

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TRUE RELATION OF METRIC AND IMPERIAL SYSTEMS.

Weights.

			Approximate Equivalence adopted in B.P. dosage.
1 milligram (Mg)	$= \frac{1}{1000}$ gram	= 0·001 G = 0·015 gr. nearly	1 Mg = $\frac{1}{64}$ gr.
1 centigram (Cg)	$= \frac{1}{100}$ „	= 0·01 G = 0·154 gr. „	6 Cg = 1 gr.
1 decigram (Dg)	$= \frac{1}{10}$ „	= 0·1 G = 1·543 gr. „	3 Dg = 5 gr.
1 gram (G)	$= \frac{1}{1000}$ standard or international kilogram	= 1 G = 15·4323564 „	1 G = 15 gr.
1 grain (gr.)	= 0·0648 gram nearly		1 gr. = 6 Cg. 15 grs. = 1 G
1 ounce (oz.)	= 437·5 gr. = 28·35 grams „		none.

Volumes.

	Approximate Equivalence adopted in B.P. dosage.
1 Centimil. (Cl) = vol. at 4° of 1 Cg of water = 0·169 minim nearly	6 Cl = 1 min.
1 Decimil. (Dl) = vol. at 4° of 1 Dg of water = 1·69 minims nearly	3 Dl = 5 min.
1 millilitre (Ml) = vol. at 4° of 1 G of water = 16·9 minims nearly	1 Ml = 15 min.

1 minim (min.)	= 0·0592 mil. nearly	1 min. = 6 Cl.
1 fluid drachm (fl. dr.) = 60 min.	= 3·5515 mils. „	1 fl. dr. = 4 Ml.
1 fluid ounce (fl. oz.) = 8 fl. dr.	= 28·4123 mils. „	1 fl. oz. = 30 Ml.

The adoption of the metric system is also likely to give trouble in dispensing fluids. None of the ordinary stock sizes of bottles are exactly suitable for metric dispensing. A further difficulty arises with regard to the measuring of doses by the patients. The domestic measures in common use are not very suitable for measuring the metric doses, and the compilers have given no information on this point. Probably the simplest plan will be to take 170 mils as equal to 6 oz., 115 mils as equal to 4 oz., 225 mils as equal to 8 oz., and continue to give the directions to the patient as at present.

A specimen prescription would run as follows :—

℞ Tr. Digitalis Ml 12
Syr. Aurant. Ml 15
Aq. Camph. ad Ml 170
M.

Sig. A tablespoonful to be taken thrice daily after food.

In all probability the metric system will not be generally adopted for prescribing till it is made the only official method. The present generation of medical men is almost certain not to adopt it, and as far as our present experience goes the student, when presented with the option, prefers to use the imperial system. He is probably wise to do so, as for many years to come the senior men who write the text-books on medicine will prefer to use the imperial system to which they were trained.

In every new edition of the B.P. a list is given of drugs which have been discarded. In the present case this is abnormally long. There has been a rigorous casting out of unimportant drugs included in the former edition, which have apparently lost their popularity and are

no longer used. We understand that the test employed was the practical one of finding out whether there was any prescribing of the drugs in question. After the issue of the 1898 B.P. it was found advisable to issue an Indian and Colonial Addendum, which incorporated numerous drugs and preparations used in our over-sea dependencies. As is customary, in the succeeding issue of the B.P. these additional drugs are incorporated. It is evident, however, that the drugs of the Addendum have stood the test of clinical experience very imperfectly, and an abnormal proportion have been discarded. Excluding such drugs now incorporated in the B.P. which were formerly in the Addendum, the following list summarizes the discards from the previous B.P.:—

Cantharis and its preparations
Arnicæ Rhizoma ,,
Cambogia ,,
Caoutchouc ,,
Cimicifugæ Rhizoma ,,
Cocæ Folia ,,
Conii Folia ,,
Conii Fructus ,,
Crocus ,,
Cuspariæ Cortex ,,
Elaterium ,,
Elaterin ,,
Galbanum ,,
Granati Cortex ,,
Hemidesmi Radix ,,
Jaborandi Folia ,,
Lupulus ,,
Lupulin ,,
Mezerei Cortex ,,
Moschus ,,
Papaveris Capsulæ ,,
Pareiræ Radix ,,
Physostigmatis Semina ,,
Picrotoxinum ,,

Pix Burgundica and its preparations
Pimenta ,,
Sambuci Flores ,,
Sarsæ Radix ,,
Sassafras Radix ,,
Scammonium ,,
Sinapis ,,
Sumbul Radix ,,
Veratrina ,,
Prunum
Ficus
Acidum Gallicum
Ammonii Phosphas
Antimonium Nigrum Purificatum
Argenti Oxidum
Bismuthi Oxidum
Cerii Oxalas
Ferri Arsenas
Ferri Phosphas
Plumbi Carbonas
Sodium
Sodii Sulphocarbolas
Sulphur Iodidum
Zinci Sulphocarbolas

Many preparations are also omitted. The whole class of concentrated liquors has been abandoned. The following preparations are no longer included:—

Emp. Ammoniac. C. Hydrarg.
Emp. Opii
Ext. Anthem.
Ext. Bellad. Vir.
Ext. Jalap.
Liq. Ferri Acet.
Liq. Ferri Pernit.
Liq. Sod. Ethyl.
Liq. Thyroid.
Mist. Creosot.
Mist. Sp. Vin. Gall.
Succ. Hyoscyam.
Succ. Bellad.
Tinct. Aloes
Troch. Sod. Bicarb.
Unguent. Plumbi Acet.
Unguent. Glycer. Plumbi Subacet.

This list does not include drugs formerly included in the Indian and Colonial Addendum only, which are now omitted. A great number of such drugs and preparations are now discarded, which were tentatively included in the Addendum.

The following list shows what alterations have been made in the names of articles and preparations :—

Former Name.	Present Name.
Adeps	Adeps Præparatus
Aloe Barbadensis	Aloe
Aloe Socotrina	
Alumen	Alumen Purificatum
Benzol	Benzenum
Borax	Borax Purificatus
Carbonis Bisulphidum	Carbon Disulphidum
Eucalypti Gummi	Kino Eucalypti
Extractum Aloes Barbadensis	Extractum Aloes
Extractum Belladonnæ Alcoholicum	Extractum Belladonnæ Siccum
Extractum Cascaræ Sagradæ	Extractum Cascaræ Sagradæ Siccum
Extractum Euonymi Siccum	Extractum Euonymi
Extractum Hyoscyami Viride	Extractum Hyoscyami
Extractum Nucis Vomicæ	Extractum Nucis Vomicæ Siccum
Extractum Opii	Extractum Opii Siccum
Extractum Viburni Prunifolii Liquidum	Extractum Viburni Liquidum
Ferrum Tartaratum	Ferri et Potassii Tartras
Hydrargyri Oleas	Hydrargyrum Oleatum
Linum	Lini Semina
Linum Contusum	Lini Semina Contusa
Liquor Iodi Fortis	Tinctura Iodi Fortis
Liquor Magnesii Carbonatis	Liquor Magnesii Bicarbonatis
Oleum Gynocardiæ	Oleum Chaulmoogræ
Oleum Pini	Oleum Abietis
Oleum Terebinthinæ	Oleum Terebinthinæ Rectificatum
Pilula Aloes Barbadensis	Pilula Aloes
Pilula Aloes Socotrinæ	
Rhei Radix	Rhei Rhizoma
Senna Alexandrina	Sennæ Folia
Senna Indica	
Soda Tartarata	Sodii et Potassii Tartras
Sodii Arsenas	Sodii Arsenas Anhydrosus
Syrupus Codeinæ	Syrupus Codeinæ Phosphatis
Tinctura Colchici Seminum	Tinctura Colchici
Tinctura Iodi	Tinctura Iodi Mitis
Trochiscus Eucalypti Gummi	Trochiscus Kino Eucalypti
Unguentum Gynocardiæ	Unguentum Chaulmoogræ
Unguentum Hydrargyri Oleatis	Unguentum Hydrargyri Oleati

Despite the enormous output of new synthetic drugs since the last issue of the B.P., the list of drugs included for the first time in the new B.P., is not very long, and not all of these are of recent introduction. In several instances new names have been coined for drugs chiefly prescribed under well-known trade names without giving any assistance in recognizing the drug. *Acetylsalicylic acid* is the chemical designation for the proprietary preparation *aspirin*. *Barbitonum* is a new name for diethylbarbituric acid, better known under its trade name *veronal*. *Benzaminæ lactas* is the new name for β-*eucaine*, a well-known trade name. *Diamorphine hydrochloride* is also better known as *heroin*. *Chloral formamide* is usually called by its synonym *chloralamide*. *Hexamine* is a short form of *hexamethylenetetramine*, the chemical name for the drug *urotropine*. *Methyl-sulphonal*

was at one time largely used under its trade name *trional*. *Theobromine and sodium salicylate* is the same as the proprietary drug *diuretin*. It will be noted that no new arsenical organic compounds are included, nor is there any official recognition of sera or vaccines.

ARTICLES AND PREPARATIONS INCLUDED IN THE NEW B.P. WHICH WERE NOT PREVIOUSLY OFFICIAL EITHER IN THE B.P. OR ADDENDUM.

Acetonum
Acetum Cantharidini
Acidum Acetylsalicylicum
Acidum Hydriodicum Dilutum
Acidum Picricum
Adrenalinum
Barbitonum
Benzaminæ Lactas
Calcii Lactas
Cantharidinum
Cassiæ Fructus
Chloral Formamidum
Cresol
Diamorphinæ Hydrochloridum
Emplastrum Cantharidini
Ethyl Chloridum
Ferri Phosphas Saccharatus
Glucosum
Guaiacol
Guaiacol Carbonas
Hexamina
Injectio Strychninæ Hypodermica
Ipomoæ Radix
Liquor Adrenalini Hydrochloricus
Liquor Cresol Saponatus
Liquor Formaldehydi
Liquor Formaldehydi Saponatus
Methyl Salicylas
Methylsulphonal
Pelletierinæ Tannas
Phenolphthaleinum
Resorcinum
Sennæ Fructus
Sevum Benzoatum
Sodii Phosphas Acidus
Strontii Bromidum
Syrupus Acidi Hydriodici
Theobrominæ et Sodii Salicylas
Tinctura Cantharidini
Unguentum Cantharidini
Unguentum Lanæ Compositum
Unguentum Plumbi Subacetatis
Zinci Oleostearas

One of the most troublesome features of the new B.P. is the large number of cases in which the strengths of preparations have been changed, though no indication is given in the name or dose. As these changes have occurred in the case of many drugs which are in constant use, every medical man must familiarize himself with the following list.

CHIEF ALTERATIONS IN STRENGTH AND DOSE.

PREPARATIONS MADE STRONGER.

Name	Stronger by	New Dose
Acetum Scillæ	100 per cent.	5–15 ♏ = 3–10 Dl
Amyl Nitris		2– 5 ♏ = 12–30 Cl
Lin. Opii	33·3 ,,	
Sp. Æther. Nit.	6 ,,	15–60 ♏ = 1– 4 Ml
Sp. Juniper.	100 ,,	5–20 ♏ = 3–12 Dl
Syr. Chloral	9 ,,	
Syr. Codein. Phos. ..	8·5 ,,	
*Tinct. Aconit. ..	100 ,,	2– 5 ♏ = 12–30 Cl
Tinct. Camph. Co. ..	10 ,,	
*Tinct. Opii	33·3 ,,	
Tinct. Strophanth. ..	400 ,,	2– 5 ♏ = 12–30 Cl
Troch. Morphinæ ..	11 ,,	
Troch. Morph. et Ipecac.	11 ,,	
Unguent. Hydr. Subchl. ..	100 ,,	
Vin. Aurantii	20 ,,	

PREPARATIONS MADE WEAKER.

Name	Weaker by	New Dose
Acid. Nit. Dil.	42 per cent.	
Acid. Phos. Dil. ..	27 ,,	
Acid. Sulph. Dil. ..	26 ,,	
Emp. Bellad.	50 ,,	
Ferr. Carb. Sacch. ..		
Inj. Coc. Hypoder. ..	50 ,,	5–10 ♏ = 3–6 Dl
Inj. Morph. Hypod. ..	50 ,,	5–10 ♏ = 3–6 Dl
Lin. Hydrarg. ..	40 ,,	
Liq. Ferri Perchlor. ..	11 ,,	
Liq. Hydrarg. Perchl. ..	12 ,,	
Liq. Potass.	19 ,,	
Pil. Phosphor.	50 ,,	1–4 gr. = 6–25 Cg
*Syr. Ferr. Iodidi ..	30 ,,	
Tab. Trinitrin.	23 ,,	
*Tinct. Bellad.	30 ,,	
*Tinct. Colch.	50 ,,	
*Tinct. Digit.	20 ,,	
Tinct. Ferri Perchlor. ..	11 ,,	
*Tinct. Nuc. Vom... ..	50 ,,	
Tinct. Opii Ammon. ..	10 ,,	
Troc. Acid. Carbol. ..	50 ,,	
Unguent. Acid. Carbol. ..	25 ,,	
*Unguent. Hydrarg. ..	38 ,,	
Ung. Hydrarg. Ammon. ..	50 ,,	
Ung. Hydrarg. Co. ..	50 ,,	
*Vin. Antimoniale	14 ,,	

* These preparations correspond approximately to those recommended in the International Agreement, September, 1906.

Some of these alterations may prove troublesome, as the practitioner, accustomed to the old strength, may not obtain the results he expects. Particular attention should be paid to the increase in the strength of tincture of strophanthus and of tincture of opium. Laudanum now contains one-third more opium without any alteration in the official dose. Tincture of strophanthus is now four times the former strength, and the dose has been reduced from 5 to 15 min. to 2 to 5 min. Thus a forgetful prescriber may think he is administering a small dose of 5 min. of the old tincture, and find that he is administering the full dose of the new strong tincture. There is in this case no check by the dispenser, as the dose will still lie within the normal range and not attract special attention.

There seems no special reason for the increased strength of the syrups of chloral and codeine phosphate. The alteration in the strength of the three dilute acids arises from the fact that all dilute mineral acids now contain 10 per cent by weight of the pure acid. In order to have a uniform dosage of 3 to 6 Dl (5 to 10 min.) for all the hypodermic injections, the strength of the cocaine and morphine preparations has been reduced by one-half. For a similar reason

the strength of spirit of juniper has been increased by 100 per cent, and the dose correspondingly reduced so as to bring it into line with the rest of the simple spirits.

In many of the remaining instances the changes are the direct result of the International Agreement to promote uniformity in the strengths of important galenical preparations containing potent ingredients. Changes of this nature have been marked with *. Though the preparations involved are not numerous, it is unfortunate that so many in constant use should be affected, as it will for some time lead to confusion.

The last list of alterations that requires to be noted is that of preparations which have had important alterations made in their *composition*.

Preparations formerly made with Cantharis are now made with cantharidin.
Confection of Sulphur is made with precipitated Sulphur.
Compound Decoction of Aloes contains no saffron.
Dry Extract of Belladonna is made from the leaves instead of the liquid extract of the root. It was formerly called Alcoholic Extract of Belladonna.
Extract of Ergot is a watery extract which is concentrated by evaporation and then treated with alcohol. Formerly the ergot was exhausted with alcohol, the extract concentrated, and water added.
Extract of Hyoscyamus is an alcoholic extract of the leaves. It is standardized to contain 0·3 per cent of alkaloid. It replaces the former green extract, which was an evaporated juice.
Liquid Extract of Ipecacuanha contains 2 per cent of the alkaloids of the root instead of the former 2 to 2½ per cent. It is an alcoholic extract now made without adding calcium hydroxide. There is no expectorant dose.
Dry Extract of Nux Vomica, formerly Extract of Nux Vomica, is made from the liquid extract, but is standardized with calcium phosphate instead of milk sugar to contain 5 per cent strychnine.
Saccharated Carbonate of Iron contains 50 per cent instead of 33·3 per cent of ferrous carbonate, and is now made from ferrous sulphate by boiling with glucose and sodium carbonate instead of refined sugar and ammonium carbonate.
Mercuric Oleate is made from yellow mercuric oxide by the action of oleic acid instead of acting on mercuric chloride with sodium oleate. The new name is *Hydrargyrum Oleatum*.
Tincture of Belladonna is made from the leaves instead of the liquid extract of belladonna.
Compound Tincture of Cardamoms is made with weaker alcohol, but contains rather more cardamoms and caraways, while glycerin replaces raisins.
Compound Tincture of Cinchona contains no saffron, and is now standardized to contain 0·5 per cent of alkaloids.
Tincture of Hyoscyamus is now a 10 per cent tincture made from the leaves with 70 per cent alcohol.
Tincture of Virginian Prune now contains one-tenth of glycerin.
Tincture of Strophanthus, in addition to the fourfold increase in strength, is prepared differently. The powdered seeds are first treated with ether, and then dried before the tincture is made.

Lozenges show slight changes in most cases, either in the basis selected or in the strength.

Phenol Lozenge is made with a special basis, and is now about half the former strength.

Tannic Acid and Ipecacuanha Lozenges are made with different basis.
The following lozenges contain roughly one-twelfth less active ingredient: *Tannic Acid, Benzoic Acid, Catechu, Reduced Iron, Eucalyptus Gum, Krameria, Santonin, Sulphur.*
The lozenges of *Compound Bismuth* and the two containing *Morphine* have respectively one-quarter more bismuth and one-ninth more morphine than formerly.

Ointments also show many minor changes, chiefly in the basis, though there are in a few cases important alterations in the strength.

Benzoated Lard replaces soft paraffin in White Precipitate, Iodoform, and Lead Iodide Ointments.
Soft Paraffin replaces lard in Chrysarobin Ointment.
Wool Fat is introduced into Belladonna Ointment.
Soft Paraffin into Hamamelis Ointment.
Beeswax into Paraffin Ointment.
Prepared Lard into Tar Ointment.
Glycerin has been left out of Phenol Ointment; *Benzoin* out of Spermaceti Ointment.
Borax replaces Spermaceti in Rosewater Ointment.
Hard and Soft Paraffin and Benzoated Lard replace spermaceti and olive oil in Capsicum Ointment.

Liniment of Mercury is made from Ung. Hydrarg., and thus contains less mercury.
Solution of Atropine Sulphate contains no salicylic acid.
Black Mercurial Lotion contains no mucilage of tragacanth.
Compound Mixture of Iron shows slight alteration in quantities of ingredients. Sugar is replaced by glucose, and gum acacia is introduced.
In *Iron Pill*, glucose replaces syrup and glycerin, and tragacanth and acacia are reduced. The new mass contains 22·5 per cent instead of 20 per cent of ferrous carbonate.
Compound Calomel Pill, besides small differences in amount of ingredients, has a new excipient of acacia, tragacanth, and syrup of glucose, instead of castor oil and alcohol.
Phosphorus Pill is half its former strength, and is made with a different excipient.

A minor feature is the adoption of an official list of contractions, which, as a rule, correspond to those generally in use.

On the whole, the revision has resulted in an improved Pharmacopœia, though already exception has been taken to some of the preparations, notably in the case of *Liq. Cresol Saponatus*, where it has been pointed out that the use of castor oil instead of linseed oil adds considerably to the expense without increasing the value of the preparation. There are a few misprints and errors, and it has been found necessary to issue a list of corrigenda. Probably a greatly increased list will shortly be issued, as the index is by no means perfect, and contains numerous errors. One of the alterations which has not been very happy is the adoption of a system of empirical chemical formulæ for the organic compounds in place of the structural formulæ of the former edition.

THE INCIDENCE OF THE NEW BRITISH PHARMACOPŒIA ON MEDICAL AND PHARMACEUTICAL PRACTICE.

By H. WIPPELL GADD, F.C.S.
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It is not necessary to discuss in detail the changes introduced by the new issue of the British Pharmacopœia ; they are ably dealt with elsewhere in this volume; but I desire to indicate some general effects consequent upon or incidental to its publication.

The main source of all the difficulties which have already been experienced and will be increasingly felt is the synchronism of publication and authorization. There is no interval of grace, in which those interested may become familiar with the changes, existing stocks may be exhausted, and new preparations may be manufactured.

As by a legal convention, every foreigner who steps on our shores, and every citizen who attains maturity, is expected to have a complete working knowledge of the laws of England, so every practitioner of medicine or of pharmacy is presumed to be familiar on the 31st of December, 1914, or possibly on the 1st of January, 1915 (as the *Gazette* is published on Fridays), with any changes in the Pharmacopœia, published and authorized on that day, which may affect his practice or modify his habits of thought and professional activity.

It is true that the General Medical Council caused to be displayed at their offices certain, so to speak, chained copies of their new work for some three months before the date of its actual publication ; but everyone does not reside in London, nor is it easy to digest hurriedly a mass of information made available in a public place, however comfortably appointed and courteously served. Moreover, the efforts of the medical and technical papers to enlighten their readers were harassed and hampered by the fear of committing breaches of copyright, which were threatened with dire penalties.

For all practical purposes, the Pharmacopœia was new in every sense when it sprang into being at the dawn of the new year, like Minerva, fully armed. But what is the measure of authority inherent in the Pharmacopœia ; when must its precepts be obeyed, and when, if ever, may or must they be ignored ?

For answer, one must review briefly the legal position, which, strangely enough, has only been tested forensically in proceedings brought under an Act in which the Pharmacopœia is not named, viz., that which deals with the Sale of Food and Drugs.

The chief operative section in the principal Sale of Food and Drugs Act in this respect, is that which enacts that it shall be an offence to sell any article of food or any drug which is not of the nature, substance, and quality of the article demanded by the purchaser ; and the general effect of the judgements, in a series of cases, is that when a compound medicine is demanded by a name which occurs in the Pharmacopœia,

an article made in accordance with the formula and answering the tests, if any, of the Pharmacopœia, is presumed to be required, and only very strong evidence to the contrary will suffice to rebut such presumption.

As Mr. Justice Phillimore put it in the course of his judgement in the case of Dickins *v.* Randerson (L.R. [1901] I., K.B. 437) :—

> The cases quoted established the fact that if a drug was to be found in the Pharmacopœia and this drug was asked for, that drug must be supplied, and if it were not sold with the ingredients in the proportion prescribed by the British Pharmacopœia there was at least prima facie evidence that what was sold was not of the nature, substance, and quality demanded.

In the case, however, of Boots Cash Chemists (Southern) Ltd. *v.* Cowling, (1903, 67 J.P. 196), where the magistrate had refused to receive evidence that there was a commercial standard for liniment of soap different from that prescribed by the British Pharmacopœia, holding that he was bound not to do so by the decision in Dickins *v.* Randerson ; on appeal to the Divisional Court, it was decided that the evidence ought to have been received, although the Court expressly refrained from expressing any opinion as to what its value might be. In the course of this judgement, Lord Alverstone, C.J., said :—

> It was quite clear that Phillimore, J., never meant to lay down in that case (Dickins *v.* Randerson) that nothing could be looked at except the British Pharmacopœia. On the other hand, if it were a sale of some drug recognized by a special name in the Pharmacopœia, a very strong prima facie case would be made out as to what the drug ought to contain.
>
> Any evidence, therefore, tendered to show that a commercial standard did exist different from that prescribed by the Pharmacopœia, ought to be received. To say that no evidence of this kind was admissible because of the decision in Dickins *v.* Randerson was, in the opinion of the Court, going too far.

It must be noted, however, that these and other leading cases deal only with simple commercial transactions, that is to say, with actual sales of medicinal preparations. None of them have to do with the dispensing of physicians' prescriptions, a transaction which, although usually involving a sale, differs from a sale pure and simple.

When a prescription is presented for dispensing to a pharmacist, who accepts it for that purpose, a contract is tacitly made between the parties to the effect that the pharmacist will translate the prescription and make up the medicine in accordance with what appears to him, in the light of his technical training and experience, to be the intention of the prescriber.

I submit, therefore, that a pharmacist, to whom is presented a prescription dated on or after the 1*st of January*, 1915, *is not necessarily bound to make, and may not even be justified in making it up with ingredients compounded in accordance with the formulæ and answering to the tests and conforming to the standards of the new Pharmacopœia.*

On the contrary, it is conceivable that by so doing he might lay himself open to an action for negligence for not exercising such skill and knowledge as would be presumed to be that of an ordinary and average practitioner of his profession. [We are of the same opinion.—Ed. M.A.]

In an extreme case, the negligence might be such as to incur a criminal liability, and to justify a prosecution for manslaughter, and it would be little consolation to know that there was, as would doubtless be the case, contributory negligence on the part of the prescriber, for which he might also have to answer.

That this is no fancy picture may be shown by citing an example to which some attention has already been given, but which cannot be too widely known and discussed, namely, that of Tincture of Strophanthus. When the drug Strophanthus was introduced by Professor Fraser (now Sir Thomas Fraser, and a member of the Pharmacopœia Committee of the General Medical Council), he recommended, I believe, that the tincture made from it should be of the strength of 1–20 ; certainly this was the strength ordered when the tincture first became official by being inserted in the additions to the 1885 Pharmacopœia which were published in 1890. But, presumably, this was found to be too strong, for in the Pharmacopœia of 1898 the strength was reduced to 1–40.

Since that date, a good deal of work has been done on the drug by pharmacologists, and in 1905, in a paper read before the British Pharmaceutical Conference at Brighton, Dr. W. E. Dixon recommended the physiological standardization of the tincture, and stated that the official tincture would generally have to be diluted to bring it down to a proper standard.

The standard as given by Dixon was that a quarter of a minim of the tincture should be sufficient to arrest the heart in systole of a frog weighing 20 grams in about an hour. Now I have evidence before me, accumulated during the last five years, that, tried by this standard, tinctures made in accordance with the 1898 Pharmacopœia proved to be too strong in the majority of cases. When therefore one heard that a change was to be made, one not unnaturally supposed that the strength of the tincture was to be reduced, and it was somewhat of a shock to find that, on the contrary, in the Pharmacopœia of 1914 it has been increased fourfold. The strength is now 1–10 instead of 1–40. It is true that the dose is at the same time reduced from 5 to 15 minims to 2 to 5 minims, or in the metric system 12 to 30 centimils ; but this change, even if it be always remembered by prescribers, does not entirely meet the case ; and, to increase the danger, very unfortunately there is a misprint in the text of the Pharmacopœia by which the metric dose is made to read 12 to 50 centimils, although this is corrected in the published corrigenda.

What, then, will be the position, if a pharmacist has a prescription for Tincture of Strophanthus, say, in 10-min. doses ? It is not for a layman to say what will be the effect on the patient, and happily

there is no need to take such responsibility, for Professor Whitla, himself a member of the Pharmacopœia Committee, in the new edition of his valuable work on "Pharmacy, Materia Medica, and Therapeutics," which was published contemporaneously with the Pharmacopœia, says: "The new Tincture is now four times the strength of the former one, and if ordered in the old doses might prove fatal. The change was unfortunately necessary to meet the requirements of the International Agreement. The dose of two minims should rarely be exceeded. Pharmacologists calculated that the toxic action of the former tincture on the heart was eight times greater than that of digitalis. If this was correct, the new tincture should be more than thirty times more poisonous."

One hardly follows Professor Whitla when he says that a change which may produce fatal results, was necessary because of an International Agreement, when that same International Agreement is varied by the Pharmacopœia Committee when they see fit. (*See page* xxviii, "Pharmacopœia," 1914.)

A perhaps unlooked-for result of the new Pharmacopœia is the changes which it introduces into the Poisons schedule. The chief one of these is that, by increasing the Morphine content of Tincture of Opium by one-third, the tincture, which is perhaps better known by the synonym of Laudanum, is transferred from Part 2 of the Poisons schedule (that is, the part which contains those drugs which, although they can only be retailed by pharmacists under certain conditions of labelling, are not required to be entered in the Poison book) to Part 1, which requires an entry in the Poison book, and the purchaser to be known or introduced to the seller.

This change, whether intentional or not, is doubtless good, as it may, one hopes, serve to check any undesirable traffic in the drug.

Tincture of Nux Vomica, on the other hand, by being reduced in strength, is transferred from Part 1 of the Poisons schedule to Part 2.

The Pharmacopœia introduces several new chemical articles, which are said to be identical in composition with certain proprietary drugs, such as Barbitonum for Veronal, Diamorphine Hydrochloride for Heroin Hydrochloride, and Hexamine for Urotropine. It must be clearly understood, however, that their inclusion in the official volume has no effect upon patent or trade-mark rights.

* * * * *

The outstanding feature which emerges from consideration of this subject is the imperative and immediate necessity of medical and pharmaceutical practitioners familiarizing themselves with the changes in the text of the Pharmacopœia, and the necessity, when some more convenient opportunity occurs, of consideration by the Legislature of the whole subject of Pharmacopœia production, revision, and authorization.

RADIO-ACTIVITY AND ELECTROTHERAPEUTICS.

BY

CHARLES THURSTAN HOLLAND, M.R.C.S., Etc.

Hon. Med. Officer to the Electrical Department, Liverpool Royal Infirmary; President of the Electro-therapeutic Section, Royal Society of Medicine, 1914.

Beyond the fact that general advance in the utility of *x* rays in both diagnosis and treatment has taken place during the past year, there is no new outstanding discovery to which to draw attention. The most important advance is in the technique, and this is the discovery of the "Coolidge tube," a full account of which will be found in the following pages.

The larger towns throughout Great Britain, following the examples of Hull and Liverpool, have during the year appealed to the public to raise large sums of money for the purpose of supplying the hospitals with radium in quantities sufficient to undertake treatment on an elaborate scale. Manchester collected over £30,000 to equip and maintain a radium laboratory for the city and surrounding district. In the next few years it should be possible to arrive at a just conclusion as to the real value of this means of treatment in malignant disease. For over a year the Royal Infirmary of Liverpool has had the use of 130 mgrams of very good quality, and it has been in constant use in all kinds of cases of inoperable malignant disease. Although striking results have been obtained in some few cases, it cannot be recorded that any definite cure has been brought about, and taken on the whole the results in the treatment of this form of disease have been distinctly disappointing. No doubt the fact that it is used as a sort of last hope in so many late and altogether hopeless cases has something to do with its apparent failure, but at the present it is difficult to refuse to any case, however hopeless it may seem, the off chance that some benefit may result. In addition, it is almost impossible at present to make any discrimination, as occasionally it is in the least promising cases that most benefit and relief follow its use.

NEW APPARATUS.

The Coolidge x-ray Tube[1] is a noticeable advance, and marks an important step forward in radiography and radiotherapy (*Figs.* 1 *and* 2). The cathode consists of a tungsten wire surrounded by a molybdenum tube. The tungsten spiral is heated by an electric current, and the exact quality of the *x* rays given off is regulated by adjusting the temperature of the cathode. The tube rectifies its own current; both the intensity and the penetration of the *x* rays are under complete

control ; it can be used continuously for hours with either high or low discharge current ; it shows no fluorescence. Even with a sharp focus it will carry 25 ma. with a spark gap of 7 cm. for hours at a time without any attention. When it comes into general use, and

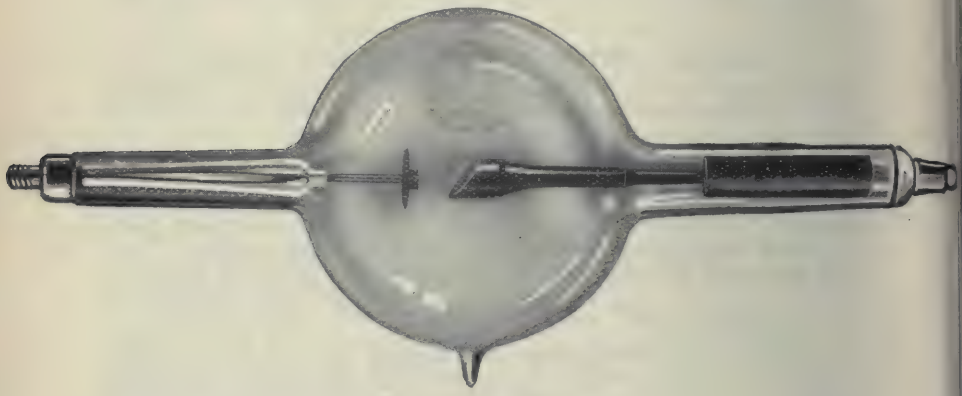

Fig. 1.—The Coolidge tube.

when its technique is mastered, it should bring about revolutionary changes in radiography, and especially in *x*-ray therapy. It is impossible to overrate its importance in the direction of the treatment of malignant disease.

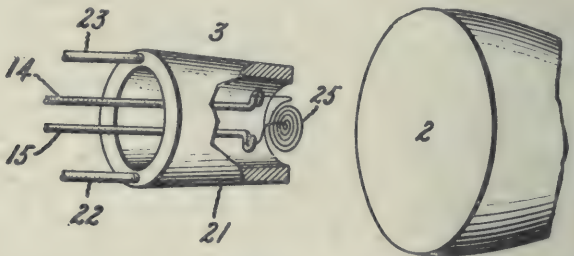

Fig. 2.—The COOLIDGE TUBE.—2, The anticathode; 3, The cathode; 14, 15, 22, 23, Molybdenum wires; 21, Stem of molybdenum; 25, Tungsten spiral.

R. Morton[2] has designed an apparatus to suppress the inverse current, and so, with a coil and mercury break, do away with the necessity for valve tubes. He applies the principle of the high-tension rectifier. *Fig.* 3 shows the arrangement in plan and elevation. The parts are similarly lettered in the three different views. PP represent the contacts of the mercury interrupter, SS the contacts of the high-tension switch connected in series in the *x*-ray tube circuit, and C indicates the rotary switch arm in its simplest form. In practice this consists of two, or sometimes four, such arms. The whole is

rotated by the motor of the primary interrupter M. The break B is driven by the motor M. On the upper prolongation of the motor spindle is mounted a stout ebonite shaft, which carries a metallic connector C; the break and connector thus revolve together. At opposite points the connector C just clears two segments, SS, the terminals of a gap in the secondary circuit. The figure shows the position of the parts at the moment of 'make.' The jets are just making contact with the primary contacts P, and at this moment the connector C is separated from the secondary terminals S by a wide gap at each end. As the connector C approaches the segments S, the inverse current dies out, and at the moment of 'break' C is

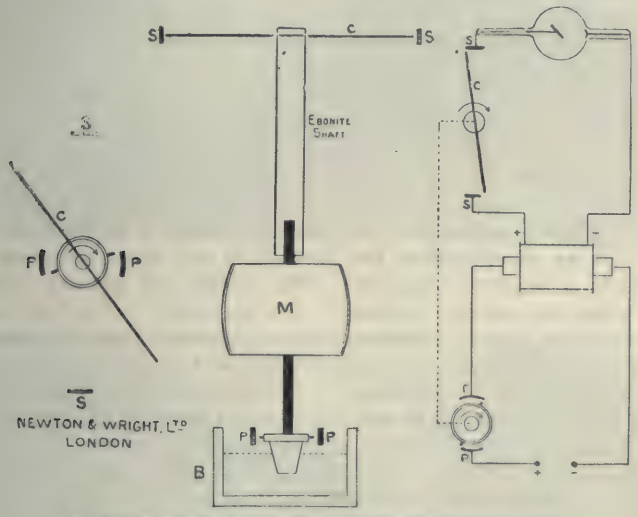

Fig. 3.—R. Morton's apparatus for suppressing the inverse current.

opposite SS, and the secondary circuit is closed. The device can be adapted to any coil. It is not a rectifier, but an interrupter for both primary and secondary circuits.

In the complete apparatus the contacts SS are arranged on a circular support, allowing them to be rotated through a sufficient angle to adjust them to the correct phase of the circuit.

Corbett's[3] *new radiometer* renders the determination of the Sabouraud dose much more accurate and scientific. The pastille as usually employed with a painted 'Standard B tint' leaves much to be desired in the way of accuracy, the standard tints often varying considerably when new, and easily becoming soiled. Such factors also as the colour of the daylight, and even of the wall-paper in the room, seem to have an effect upon the comparison. The new instrument consists of a small viewing box, divided by a central partition, so that on looking through the eye-piece one sees a white background through

two small circular apertures. Through one of these the pastille is viewed, and in the other, carefully prepared glass standard tints can be inserted so that the light reflected from the pastille can be compared with that transmitted through the coloured standard. The colour standards usually provided represent $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{4}{5}$, 1, $1\frac{1}{5}$ and 2 B. The error in estimating the tint with this instrument need never exceed 10 per cent, and it is adapted for working with daylight or artificial light.

References.—[1]*Arch. Röntgen Ray*, 1914, i, 359, and *Amer. Jour. Roent.* 1914, 125 ; [2]*Arch. Röntgen Ray*, 1914, i, 412 ; [3]*Ibid.* 443.

X-RAY DIAGNOSIS.

Gall-stones.—There is increasing evidence that with better technique the *x*-ray diagnosis of these stones is becoming more certain. George and Gerber[1] point out that pure cholesterin stones are not common, and that most stones contain some calcium. They are of opinion that the demonstration of gall-stones by *x* rays has already reached a position that warrants the more general use of this method as a means of diagnosis ; and that they can be shown in nearly every case of gall-bladder disease of long standing where stones are really present. Cole,[2] however, concludes a paper in which he records twenty cases, by saying that although they can be detected sufficiently often to warrant an examination, the absence of any direct evidence does not justify a negative diagnosis, and should not prevent surgical intervention on clinical evidence. He also lays stress on the indirect evidence which is obtained from a bismuth meal, as presented by adhesions involving the duodenal cap and so causing alterations from the normal in its appearance. Thurstan Holland,[3] in reporting further successful cases, is in agreement with Cole as to the unreliability of the negative evidence, and suggests that they cannot be shown in more than about 30 per cent of the cases in which they are actually present. In this paper the differential diagnosis from other shadows (kidney stones, calcareous glands) is discussed, and the more characteristic features of the gall-stone shadow pointed out.

Pfahler[4] lays stress upon the importance of exact technique, and describes in detail the preparation and the position of the patient, the position of the tube, the exposure, and the vacuum of the tube. He takes about half a dozen plates in different positions of the patient, and also injects the colon with air and exposes more plates. He is of opinion that he can show gall-stones in at least 50 per cent of his cases. He suggests that sometimes pure cholesterin stones can be recognized by their increased transparency as compared with the liver, giving a sort of mottled appearance.

In a discussion on the *technique and standardization of bismuth meals*,[5] much diversity of opinion manifested itself, as much in the quality and quantity of the vehicle as in the quantity of bismuth employed. A number of the best known *x*-ray workers give details of the meals they use, and these are found to vary within very wide limitations in every respect. The discussion seems to emphasize the

Fig. A.—Woman, 43 years. Typical hour-glass constriction of stomach; *x* ray 8 hours after the meal; food in both sacs, and food in the constriction.

Fig. B.—Woman, 26 years. True hour-glass constriction masked by pressure from a gas-dilated transverse and descending colon; after clearing out the bowel, a typical hour-glass constriction from penetrating ulcer of the lesser curvature was plainly shown.

C. Thurstan Holland

PLATE II.

X-RAY DIAGNOSIS OF HOUR-GLASS STOMACH—*continued*

Fig. C.—Woman, 36 years. Simulation of hour-glass constriction by pressure from a gas-dilated transverse and descending colon.

Fig. D.—Male, 24 years. Simulation of hour-glass constriction by spasms.

C. Thurstan Holland

fact that the exact composition of the meal is not so important as the deductions of the individual worker, and that it is impossible to insist on any standard which would be satisfactory to all. Jordan,[6] whose technique for the opaque meal differs altogether from other workers, describes his methods in full. He advocates the use of a thin emulsion instead of the ordinary thick meal, and uses quantities of carbonate of bismuth, which he prefers to barium. The advantages of this method are pointed out, and he discusses and answers the objections which have been from time to time suggested by others. He always examines the œsophagus, duodenum, and bowel, in addition to the stomach, and claims that his meal has many advantages if this procedure is to be followed.

Howard Pirie[7] describes a method of *the preparation of the barium sulphate*, for the opaque meal, which has many advantages, the most important of which is that it renders the meal more palatable. He fills a gallon earthenware pot one-quarter full of the salt, and adds hot water. This he stirs thoroughly and allows to stand for one hour, then pouring off the bulk of the water. This process is repeated three times, and then the mixture stands all night. The barium settles down, and the surface portion is skimmed off and used for making the meal. This surface barium is quite free from all grit, and he claims that it is less unpleasant to the taste, is safer, and mixes better with the vehicle.

The *Report on the Radiography of the Stomach and Intestines*, prepared by the late Lester Leonard[8] for the Congress of Medicine in 1913, is a very complete paper on the subject, and is of special value in giving a bibliography of all the important papers published by various workers throughout the world up to that date.

Thurstan Holland[9] analyzes his findings in a series of 34 consecutive cases of **Hour-glass Stomach** (*Plates I and II*). He points out the frequency of this condition, and shows that the correct diagnosis in the majority of the cases is entirely an *x*-ray one, as in the whole series the condition had, before the *x*-ray examination, been suspected in two only. The sex occurrence is interesting, as 32 of the 34 were females. In this paper the relationship of gastric ulcer to cancer is discussed, the suggestion being that the sex occurrence, and the almost total absence of malignant disease in these cases, which might be described as the worst class of gastric ulcers with the maximum amount of irritation, seemed to point to ulcer not being usually the predisposing and pre-existing cause of cancer.

The technique of *inflation of the stomach with air as an aid to Röntgen diagnosis* is described by Haenisch.[10] The stomach should be empty, and air should be slowly injected by means of a stomach tube until the patient feels the first sensation of pressure. If at that moment an instantaneous radiograph is taken, it shows the contour of the stomach clearly, and usually some portion of the duodenum. It is a revival of an old method, and the author claims that it is sometimes a useful adjunct to the ordinary barium-meal method.

For the examination of the duodenum Palefski[11] advocates strongly the use of a *duodenal tube*. He gives a full account of the technique. The tube is passed right into the duodenum, and in addition to aiding in the diagnosis of conditions such as pyloric spasm and stenosis and ulcer, it is used to withdraw duodenal contents for the examination of the pancreatic enzymes, and for the local treatment of pyloric and duodenal ulcers.

Two comprehensive papers on the general value of *x*-ray examinations are those by Mills[12] and Cole,[13] who cover the whole ground of gastric and intestinal work. Mills thinks that never previously in the history of medicine has a means of physical examination of such great possibilities been so suddenly developed, but insists that its greatest worth can be only obtained if its findings are correlated with the clinical phenomena. Cole advocates *serial Röntgenography*, and takes thirty-two plates of the stomach alone as a beginning; following this at intervals many more plates are exposed, some of them stereoscopically; further plates of different parts of the bowel are taken, the gall-bladder area is examined, and finally a barium enema is given. He says that by carefully studying all these plates collectively and individually, and comparing the findings of one portion with another, it is often possible to unravel the most complicated cases. This paper of Cole's is freely illustrated, and is a colossal piece of *x*-ray work. [No doubt work of this kind is most thorough and complete, but it is open to doubt whether the results are commensurate with the enormous amount of time and money expended. Probably by simpler and less costly methods many workers arrive at equally satisfactory results. Certainly in England neither hospitals nor private patients could be persuaded to go to so much expense.—C. T. H.] Cole[14] has a further paper confined solely to the diagnosis of duodenal ulcer. Again serial radiography is the method advocated, and twenty-four plates are used. He claims absolute success in all cases, and says that the diagnosis of post-pyloric ulcer is as accurate as that of renal or ureteral calculus.

As against Cole's multiple plate method, Case[15] states that the making of plates is of very minor consequence in the average Continental laboratory, and that examination on the screen is all-important. He also agrees that in the examination of the alimentary tract fluoroscopy is the method of choice. It is essential that, in conjunction with this, palpation under the screen should be practised, and he warns against the use of the hand, protected or otherwise. He strongly urges the use of the 'wooden spoon,' and gives details of the manner in which it should be used. He also shows prints demonstrating its possibilities.

Further reports of **Hair Balls in the Stomach** are recorded by Barclay[16] and Holland.[17] The illustrations again demonstrate the remarkable manner in which the hair ball takes the shape of the *x*-ray stomach, and the certainty with which the accurate diagnosis is made. In neither case had any suspicion of the real condition been aroused prior to the *x*-ray demonstration, and in Holland's

case an abdominal tumour had been known to be present for ten years, and had been under the observation of many physicians and surgeons.

Cinematography of the antrum pylori, pylorus, and first part of the duodenum has advanced a step by means of the apparatus devised and described by Pirrie.[18] Instead of taking a number of plates or films, Pirrie makes all the exposures on one plate, and takes sixteen pictures, each 3½ in. by 4¼ in., on a plate 14 by 17 in. By an ingenious system of runners and notches the plate is automatically shifted for each exposure ; each movement takes half a second, and each exposure 1 to 1½ seconds—his *x*-ray apparatus not taking such pictures with a shorter exposure—and the whole cycle takes 32 seconds. With an apparatus giving shorter exposures this time could be lessened, but the radiographs published are very sharp and clear, so that further speed is not necessary. Diagrams of the table used, and a full description of the technique, are published. The author states that it has proved of value in diagnosis of duodenal ulcer, pyloric stenosis, early pyloric carcinoma, gall-stones, and gastric and duodenal adhesions. With regard to gall-stones, he says that the very faint shadow when confirmed many times on a series of plates has led to the correct diagnosis. Not the least value of this apparatus is the complete protection to the operator, not only whilst the plate is exposed, but also for the purpose of a screen observation.

Appendix.—Quimby[19] finds that as a rule the appendix is filled six hours after the meal, and that it will contain food for thirty hours. The examination is made on the screen, and the cæcum has to be palpated out of the way. Kinked and adherent appendices can be demonstrated, and, what is of importance, ocular proof is obtained that it is the appendix which is palpated ; that is, the exact position of the organ is fixed. Holzknecht and Singer[20] also claim that it is often possible to diagnose chronic appendicitis by *x* rays. They do not rely so much on actually seeing the appendix full of food, as on identifying the site of the pain and tenderness in the cæcum, the approximate position of the appendix being indicated by this. A further communication on the same subject comes from George and Gerber,[21] illustrated by many beautiful radiographs. They show that in a number of cases of severe constipation with indefinite gastric symptoms, *x*-ray examination proved that the causes were definite surgical conditions in the right lower quadrant of the abdomen, and in chronic appendicitis the kinked and adherent appendix is plainly shown. Incidentally the diagnosis of left-sided appendix can be confirmed. A point in the diagnosis of appendix trouble is that in a number of cases food will remain in the appendix for many hours, even as long as five days, after the cæcum has emptied.

Head.—Gray[22] has devised a method of fixing the head in radiographing for **Skull Injuries.** It is of importance that the movements due to respiration should be controlled. The author fixes the head by pieces of bandage passed round from two or three different directions, the ends being tied to the *x*-ray table. By means of this thorough

fixation and the taking of stereoscopic plates, fractures and their course, size, and shape can be demonstrated with remarkable accuracy.

In the examination of the *mastoid* region, Hickey[23] says that the antero-posterior position is often of use. He makes two exposures—one of each mastoid—on the same plate, shielding each side in succession. The tube should be focussed over the tip of the mastoid, and tilted to an angle of 5°. The exposures are short. He says that by this method the difference between a normal and diseased mastoid is easily seen. Lange[24] claims great success from the ordinary lateral exposures; he quotes cases and publishes prints showing the points, and thinks that *x*-ray examination will become a matter of routine. Making three classifications, in mild first-degree mastoiditis the changes are chiefly cloudiness and haziness of cell spaces; in severe second-degree cases there is also distinct change in bone structure; in necrotic third-degree mastoiditis there is shown a partial or complete breaking down of the mastoid. (*See also* EAR, DISEASES OF.)

Johnston[25] has investigated the *radiography of the pituitary body* in its relation to **Epilepsy,** and finds that in a certain class of cases—those who, with previous good histories, between the ages of 15 and 35 begin to develop epilepsy—decided departures from normal in the topography of the sella turcica were often demonstrable. The changes for the most most part consisted in an overgrowth and folding over of the clinoid processes, especially the posterior, this causing a decided difference in the size of the pituitary fossa, and therefore in the gland itself. The author considers the frequency with which these changes were found to be striking. (*See also* PITUITARY BODY.)

Generative Organs.—The radiographic appearances of **Calcifying Fibroids** are pointed out by Scott,[26] the chief point being that the shadows they cast are not homogeneous like bladder-stones, but are of uneven density and more like those from calcareous glands. As these calcifying fibroids often cause bladder symptoms, care should be taken not to mistake the shadow for a stone. The illustrations for this paper suggest that such a mistake might be quite easily made.

Cary[27] has extended the use of radiography after the injection of collargol to the examination of the *Fallopian tubes.* In a patient with pelvic pain without any physical signs to account for it, he injected a 10 per cent solution through the cervix. The radiograph showed collargol flowing through the right tube, and none in the left. This was confirmed at the operation, the left tube being found to be occluded near the uterine end.

Belfield[28] has practised vasostomy and *injection of the seminal duct* with collargol. A preliminary injection of some non-irritating liquid, such as 5 per cent argyrol solution, should be made first to test the patency of the canal. Should this reach the urethra in a few minutes (shown by blackening of the urine), collargol solution, to 3 per cent, may be immediately injected and the radiograph taken. The author shows radiographs of various conditions, but does not explain them or suggest their value.

Various.—Davis[29] considers that an *x*-ray examination is often of diagnostic value in **Tuberculous Lymphadenitis.** He publishes radiographs of such swellings in cervical adenitis, showing dense areas which cast clear shadows. He points out, however, that the use of this method as a diagnostic agency is limited to those cases in which necrotic and caseous changes have given rise to calcification and calcium deposits. Albert Weil[30] publishes two papers on this subject. One, with Auclair, advocates the conjunction of a screen examination and instantaneous radiography in the diagnosis of glandular enlargements in the mediastinum and hilum. The second,[31] more technical, and with some good illustrations, demonstrates the best manner to show these glands, and discusses the differential diagnosis from other intrathoracic abnormal shadows. He points out its importance in children, and advises the frequent repetition of a radiographic examination in order to control the results of treatment. It is imperative, in order to compare the different radiographs of the same case, that the technique should be perfect, and the same conditions arranged when each plate is taken.

Hall-Edwards[32] publishes an interesting communication on the significance of **Phleboliths** so often found in the pelvic region when making the examination for kidney stone. His suggestion is that attacks of phlebitis and the formation of these phleboliths may cause many of the symptoms simulating calculus, for which the *x*-ray examination is made. In an experience of 20,000 radiographic examinations he has never seen a phlebolith outside the pelvic area; they are very common in the pelvis after the age of forty, and he is under the impression that they are found more often and in greater numbers on the side of the attacks of pain. Allied to this question of phleboliths, it is a point that valuable information as to the **Degeneration of Arteries** can be obtained by radiography. Somerville[33] publishes a short note on this subject, illustrated by some striking prints showing extensive calcareous deposits in the arteries of the arm. Although it is well known to every *x*-ray worker that this condition is easily demonstrable, probably few cases are radiographed for the express purpose of the examination of the vessels. Exact information as to the extent of such changes is demonstrable, and we would suggest that such facts are of value in the prognosis of life.

Goby[34] has elaborated an entirely new method of *x*-ray investigation in applying radiography to the *examination of microscopic objects*, a method which promises to be of the greatest value in microscopic biology. This method will make possible the examination of the internal structure and the superposition of different layers in opaque objects hitherto incapable of direct microscopic examination by transmitted light. We must refer the reader to the original paper for the exact description of the precise and elaborate instrumentation necessary, the method being a very ingenious one.

Another use for *x* rays is shown by Morton[35] and Hall-Edwards[36] in the *radiography of flowers*, very beautiful results being obtainable,

whilst the amount of detail shown is extraordinary. The most successful technique seems to be to use a very soft tube at a long distance from the plate, and to give a comparatively long exposure. Hall-Edwards used a Müller tube, and pumped in air until the cathode stream was visible and the equivalent spark gap only two inches.

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X-RAY THERAPEUTICS.

A *Plastic X-ray-proof Preparation* for use in radiotherapy has always been a want in the treatment of superficial lesions of irregular outline. Cumberbatch[1] has overcome the difficulty of making such a preparation, and suggests the following :—

Beeswax	4	parts by	weight
Vaseline	4	,,	,,
Resin (finely powdered)	1	,,	,,
Lanolin (hydrous)	2	,,	,,
Lead oxide (litharge) finely powdered	24	,,	,,

The first four ingredients must be melted on a boiling-water bath, in the order given, and each must be melted before the next is added. Then add the litharge slowly, stirring all the time. Allow to cool, and stir till the mixture is viscid. Keep for a few days before using. One millimetre in thickness is enough for use. Apparently this preparation will keep indefinitely.

Jean Clunet[2] in dealing with the *histological changes produced in tissues by x rays*, shows that in normal tissues rapid maturation takes place, with consequent death. In the case of the testicles the spermatoblasts were first stimulated to maturity and then destroyed. In the investigation of malignant tissues, small doses of *x* rays were given over a period of time, and sections were taken of the tumour before treatment, and at intervals during its progress. One tumour thus investigated was an atypical **Epithelioma** of the skin in an old man, in which no cell nests were present, and the following points were noticed.

For the first few days no change occurred ; after ten days the cells were much larger both as regards nuclei and protoplasm, and the nuclei showed more karyokinetic figures. In three weeks it was difficult to detect entire cells in the superficial portion, and the nuclei

were degenerated, while later still, the horny portions were attacked by young connective tissue and leucocytes. At the end of healing there were at first sight no epithelial cells left, and the young connective tissue was giving place to mature fibrous tissue; but on looking carefully among its strands some giant cells could be detected here and there, and also single cells in all gradations of development up to normal epithelial cells. These latter were looked upon as dormant cancer cells capable of bringing about a recurrence.

The Chronic Dermatitis of the Radiographer was also the subject of histological examination. The granular layer of the epithelium was found to be thickened, and, when the process had gone on to the formation of an epithelioma, an enormous hypertrophy of the papillæ with an exaggerated horny layer was found at the edge of the lesion, while in the tumour itself the cells showed monstrous nuclei and there was no distinct margin between the dermis and the epidermis. The keratin, instead of being formed from below upwards, was found to be produced in concentric masses.

The same author claims to have induced sarcomata capable of transplantation experimentally in rats. This was done by producing *x*-ray ulceration, allowing the parts to heal, and repeating the procedure several times. After the lapse of about two years, fibrosarcoma resulted.

Professor Doumer[3] has had considerable success in the treatment of the chronic dermatatis of the radiographer, and reports three cases in which the results were most encouraging. In all three cases the skin resumed its normal appearance and suppleness; the cracks and excrescences entirely disappeared; and even the telangiectases in a great measure were obliterated. The treatment consisted principally of prolonged friction by the finger tips with a pomade consisting of **Lipoic Acid** 20 to 30 per cent in a basis of inert fat such as olive oil or vaseline. This massage was carried out night and morning, and the **Negative Effleuve** was directed on to the part for ten to fifteen minutes daily, after smearing with a thin layer of lipoic acid. In all the cases treated the improvement was marked during the first fortnight.

Bearing upon the well-known fact that the effects of an *x*-ray dermatitis may be long delayed, Coley[4] records an interesting case of periosteal round-celled sarcoma of the femur, with extensive and multiple metastases, in which apparent cure resulted by the use of mixed toxins of erysipelas and *B. prodigiosus*. *X* rays were also employed in the treatment of the original lesion, and of a metastasis in the breast, and persistent dermatitis in both localities was produced. The patient remained well for ten and a half years. He then developed a tumour the size of an olive in the breast, which on removal and microscopic examination was proved to be an epithelioma. Six months later the site of the *x*-ray dermatitis on the thigh was found to be the seat of extensive malignant ulceration, which was atypical in microscopical appearance, and was pronounced by one pathologist

to be a round-celled sarcoma and by another to be an epithelioma. The author gives good reasons for looking upon the malignant growth as due to a late *x*-ray effect, rather than a lighting up of the original sarcoma.

Autopsy on a Radiologist.—A complete examination is reported on Dr. Tiraboschi,[5] who for fourteen years had been a radiologist, and who had used hard tubes with little precaution as to protection. He showed slight radio-dermatitis, had loss of strength, a nervous breakdown, and then increasing anæmia. The spleen was small. Both testicles had shrunk to the size of filbert nuts, and histological examination showed atrophy of the epithelial cells and other changes. The medulla of the ribs was examined, and considerable changes from normal were found. The grave pernicious anæmia to which he succumbed was attributed to the direct result of the absorption of the ionization products of the tissues most sensitive to *x* rays, viz., the testicles, the spleen, and the osseous medulla.

Heineke,[6] asking whether large doses of *x* rays and radium may not inflict serious injury on the blood-forming organs, recalls the frequency with which leukæmia has occurred in radiologists, six cases having been recorded.

Hernaman-Johnson[7] discusses the *relative advantages and disadvantages of x rays and radium*, and draws the following conclusions: In early cases suitable for operation, the *x*-ray tube is to be preferred to the radium capsule, whether for pre-operative or post-operative treatment. In inoperable cases the combined method of introducing the radium deeply into the tissues, and administering the *x* rays as well, is applicable, and he considers that should a necrosis of the tissues in the centre of the growth be set up by the radium, it would not be of serious import. For **Cancer of the Vagina, Uterus, and Rectum,** he considers that radium therapy is the method of choice; but should difficulty and delay be experienced in obtaining radium, the treatment may be commenced by *x* rays, which are of service in relieving pain, preventing ulceration, and causing the disappearance of external growths.

The proper time for x-ray treatment of operable **Malignant Disease,** whether before or after the operation, is a matter upon which some difference of opinion exists among radiologists. Leduc believes in lengthy pre-operative applications, while Knox, Morton, Skinner, and many others advise the post-operative, and some even hold that pre-operative applications are harmful. The arguments against them are (1) That radiated tissues do not recover from an operation with ease; (2) That deeper portions of the growth may be stimulated; and (3) That the operation may be unduly and dangerously delayed. Hernaman-Johnson[8] answers these statements, pointing out that the idea that wounds of radiated tissues do not heal easily is a legacy from the early days of radiography, when atrophy of the skin was often produced; that a dose inimical to a cancer cell can by modern technique be made to reach any desired depth in the human

body; and that while radiography should not replace surgery, there are many cases in which the time lost, which he places at about three weeks, will be compensated for by the lowered vitality produced in any of the cancer cells which may be disseminated into the healthy tissues at the time of the operation.

Pfahler[9] is of opinion that of the **Osteosarcomata** the medullary type responds best to treatment, and that the good results are more marked in osteosarcoma than in sarcoma of the soft tissues. This he thinks to be due to the fact that the greater density of the bony tissues causes them to absorb the rays in larger quantities, while the softer tissues allow them to pass through with less absorption, and consequently less therapeutic effect. In the healing process there is a gradual increase in the amount of lime salts, and the deposit seems to proceed from the periosteum. When the treatment is successful, the entire tumour becomes infiltrated with lime salts and is as dense as normal bone. The cancellous tissue never regains a normal appearnace, but presents a collection of lines without definite order. Hard rays (7 to 8 Benoist) should be used in the treatment with a filter of 3 mm. of aluminium and $\frac{1}{8}$ inch sole leather, and the cross-fire method of exposure be employed where possible. In the report 12 cases are included; 7 were cured, and have remained so for periods varying from five months to eleven years. In only 1 was there no improvement.

The same writer[10] records a case of **Carcinoma,** in which on operation the entire abdominal viscera were found matted together. The wound was closed and *x*-ray therapy resorted to. The skin of the abdomen was divided into thirty-five areas, and to each a full therapeutic dose administered. The dose was repeated in three weeks, but this interval he now considers too short, as on one or two small areas a rather severe burn was produced. The result was, however, excellent, and thirteen months after treatment the only evidence of the former disease was a little resistance in the left iliac region.

Cumberbatch[11] has had success with *x*-ray therapy in the treatment of several cases of **Persistent Suppuration.** Two cases of **Infective Periostitis** were treated, the first with Sabouraud's doses repeated every three weeks, and the second with smaller doses more frequently repeated. In the first case twelve applications were administered, and in the second, six. Both resulted in complete cures. A case of **Tuberculous Prepatellar Bursitis,** in which an operation had been performed and the cavity scraped out, was also treated. Tubercle bacilli were found, and the wound healed by first intention, but broke down later and continued to discharge pus slowly. *X*-ray applications were given once a fortnight. After the second application the discharge diminished, and after the third it stopped, and the disease became quiescent.

The same worker[12] has treated with unfiltered *x* rays a **Keloid Scar** in a child of eight years, which was raised $\frac{1}{8}$ to $\frac{1}{12}$ in. above the skin of the face. The scar was divided into four areas for treatment, each

of which received not more than half a Sabouraud dose at a sitting, and was then given at least a fortnight's rest. The surrounding skin was protected by a plastic preparation, containing lead. The treatment was continued for nine weeks, and one area of the scar was in that time level with the skin, a slight hyperæmia alone marking the original site.

Two cases of **Thymic Asthma** in infants, much improved by *x* rays, are reported by Luzzatti.[13] The first child had suffocating attacks, with cough and slight fever. The lymphatic glands were considerably enlarged, there was continuous inspiratory stridor with indrawing of the base of the thorax, and a soft round mass could be felt in the jugular fossa during expiration. The manubrium sterni was dull on percussion, and a radiogram showed enlargement of the thymus gland. Forty-one applications of the *x* rays were given, extending over a period of three and a half months. The asthma had then ceased, and the thymus gland was no longer palpable, but the lymphatic tissues remained unaltered. The second case reported was very similar. In 1912, Weil, writing of this disease, could only collect records of eleven cases treated by *x* rays, all with success. One failure has since been recorded. Regaud and Crémieu recommend in the treatment of the disease a single massive dose of 16 Holzknecht units, with a smaller dose three weeks later if necessary.

Roberts[14] treats superficial lesions, such as **Lupus, Rodent Ulcer, Epithelioma, and Carcinoma,** by making use of the *secondary radiation from silver and copper*. The copper plate used was $\frac{1}{6}$ to $\frac{1}{4}$ in. thick, the silver plate a trifle thinner, and the plate was in each case held about one inch above the skin by a wooden frame. The thickness of the plate is sufficient to cut off all the primary radiation and allow only the secondary radiation to be transmitted. The tube was placed at four to six inches from the skin, and exposures were given three times a week, and in some cases daily. It is pointed out that secondary rays from a metal are always constant and uniform in penetration, no matter what the penetration of the primary ray may be, and that where a battery of tubes of varying degrees of hardness is not available, and superficial treatment is required, rays of any desired degree of softness may be obtained from a tube of ordinary penetration by selecting a suitable metal to act as the source of the secondary radiation.

Delpratt Harris[15] recommends a combination of *radiotherapy* and *ionization with zinc*, and records many cases which have benefited by the method. The zinc is driven into the tissues by the ionizing current and comes into intimate association with the cells, and when these tissues are afterwards exposed to the *x* rays, the secondary radiations given off from the zinc molecules are responsible for the therapeutic effect noticed. **Lupus, Rodent Ulcer,** and **Superficial Ulcerations** yielded good results in the author's experience, but deep tissues were also amenable, and one case of **Caries of the Rib Cartilage** is quoted, which healed completely. He[16] also records a cure in a severe case

of **Actinomycosis,** in which there was great debility and a temperature of 104°, by injection of a solution of *iodide of potash* into the tumour and subsequent application of the *x* rays. The secondary radiations excited in the iodide in direct contact with the diseased tissues are held responsible for the cure. Large doses of iodide given by the mouth, combined with radiotherapy, had been previously tried, and did not give such rapid results.

In the treatment of **Hypertrichosis,** Chilaiditis,[17] of Constantinople, finds that if the hairs be first removed mechanically, and an *x*-ray dose administered from two to three days afterwards, the hair roots are in a much more sensitive state, and an alopecia thus produced has lasted a year. He uses a 10 x dose under a 3 mm. filter. This observation of the sensitiveness of the young hair has an important bearing on the treatment of ringworm, and should render the operator especially careful in administering a second dose when the first has failed to epilate completely.

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RADIUM.

Lazarus-Barlow,[1] in an interesting paper on the *cause and cure of cancer,* in the light of radio-biological research, puts forward the proposition that radiations, particularly those proceeding from small quantities of radium, initiate the changes which culminate in the production of cancer. He makes the following points : Radium is widely distributed throughout nature in quantities which have been shown capable of producing accelerated division in cells. It has also been shown that bacteria suspended in a fluid containing radium collect the radium from that fluid, and this observation the author considers important from the fact that cancer often occurs in association with, or subsequent to, a chronic inflammation.

Again, it can be demonstrated that radium may occur in normal tissues, but if present it is always in much smaller quantities than in carcinomatous tissues and the tissues of carcinomatous patients, and in evidence of this the results of careful experiments are quoted showing that gall-stones unassociated with carcinoma of the gall-bladder contain no radium, while gall-stones from a case where carcinoma of the gall-bladder does exist contain large quantities.

Lazarus-Barlow points out that there is some evidence that an active immunity is produced as a result of the action of radiations upon malignant cells, and maintains that if cancer cells under the influence of radium radiations are led to produce an antibody specific to other cancer cells in the tissues of the patient, then the cure of

cancer is brought appreciably nearer. If this active immunity is to be a factor in the cure, it is evident that all cancer cells in the irradiated part must not be destroyed or superficially removed, and the ideal to be aimed at in radiotherapeutic treatment would be the reduction of the vitality of the peripheral cells of the primary tumour, just sufficient to lead to the production of the antibody in quantities adequate to deal with any malignant cells which had been disseminated to distant parts before irradiation. This ideal achievement represents a narrow channel between a Scylla and a Charybdis, and he considers that the surgeon using radium has the difficult task of steering a course between too vigorous treatment on the one hand, resulting in the extensive destruction of normal cells and no production of antibody, and too feeble treatment on the other hand, resulting in stimulation of the very cells which it is desired to repress, and leaving behind numbers of insufficiently modified cells, which, after a period of quiescence, may again become active.

The *Report of the Work at the Radium Institute* for 1913[2] states that the experiences tend on the whole to confirm the conclusions of the first report. One is struck by the fact that beyond this no reference is made to the cases included in the first report: it would possibly have been of more value to have had their after-histories brought up to date. In 1913, 972 cases were dealt with, and of these 112 were not treated: 18 are reported as 'cured,' 56 as apparently cured, 152 as not improved, 37 as dead—a record not very encouraging on the face of it. In carcinoma generally the report does not seem to be optimistic, although it is stated that **Carcinoma of the Uterus** still continues to yield most gratifying results, and that a certain amount of success, chiefly from the point of view of amelioration of symptoms, has been obtained in rectal and bladder cases. In **Sarcomata** results are better, and such cases appear to do well in their early stages, and before dissemination has taken place. It is especially in such growths affecting the tonsil and post-nasal space that the best results follow.

In other conditions, **Rodent Ulcer** (*Plate III*), **Pruritus, Eczema, Psoriasis, Exophthalmic Goitre, Nævi, Keloid,** and so on, many successes are reported; it would be interesting to know how many of the 18 cured, and 56 apparently cured, are to be found amongst these. Radium emanation solution in **Arthritis Deformans** is stated to bring about some remarkable results; but most benefit is achieved when the disease is of relatively short duration. Little or no improvement can be looked for where cartilaginous or osseous changes are predominant.

Pearce Gould,[3] in an address on radium and **Cancer,** states there is no doubt that radium has influence over the life-history of animal cells, and that its 'selective power' enables us to use it to remove the cells of a malignant growth and to leave behind the healthy tissues; that the true therapeutic use of radium rests upon its selective affinity for cancer cells, and not upon a general caustic or destructive power. He says that its action is akin to that of salvarsan in the latter's selective affinity for the *Treponema pallidum*. In this address details

PLATE III.

CASE OF RODENT ULCER

Fig. A.—Duration 3 years. 130 mgrams of radium in 4 platinum tubes ·3 mm. thick applied for 23½ hours.

Fig. B.—Three months after application. No sign of growth, which gradually disappeared after the application without any sloughing.

C. Thurstan Holland

are given of eight cases of carcinoma and sarcoma, and as a result of these cases, and of many others, the author is very optimistic as to the good effects of radium treatment. The nature of the cases in which the treatment is indicated, and the dangers, including the fact that sometimes cases are actually made worse by radium, are all discussed, as also the prophylactic use to prevent recurrence. When the secret of the nature of cancer is unravelled, and more is known of the properties of radium, there will be a great extension in the therapeutic value of this agent. Several of the cases quoted, published with skiagrams and photomicrographs, were stated to be sarcoma. As showing the difficulties of accurate diagnosis and the possibilities of diagnostic errors, we would refer readers to the letters which followed, notably those of Morley[4] and Bythell,[5] who suggest that one of the most striking ' cures ' was not really a case of sarcoma but myositis ossificans traumatica.

Gould strongly advocates the *introduction of radium by tubes into the growths*, and Stevenson[6] publishes a report on some cases treated by an ingenious method of introducing needles containing the emanation. The advantages which are claimed are economy, safety, and ease of application, accurate dosage, and the possibility of subdividing a tumour into areas each of which can be efficiently treated by small quantities of emanation. This method seems to have great possibilities, and should receive attention, as it is an easy way in many cases of ensuring that the action is more uniform over the different parts of a growth, superficial and deep. It is not only applicable to superficial and subcutaneous conditions, but can also be used for cancer of the cervix uteri and other conditions. In another paper the same author[7] gives further details of the use of these needles, pointing out the methods of using either radium itself or the emanation.

Dieffenbach[8] relates his experiences in ' *the radium treatment of cancer* ' over a period of eleven years. He has a very large amount at his disposal, and gives the results in certain cases living for many years after the treatment. In inoperable breast cancer these patients were still living four, three, and two years after treatment. The principle of dosage to be remembered in all cases is that short exposures stimulate ; large, massive doses inhibit cellular growth ; and in many inoperable or advanced lesions the combination of surgery and radium will prove successful. As opposed to the opinion of Gould, already alluded to, this author states " that pathological reports on sarcoma, carcinoma, and epithelioma which had been subjected to radium treatment and subsequently excised, show conclusively that contrary to the reports of some observers, radium has no selective action on any kind of malignant cell. A massive dose will produce inflammatory degenerative changes in any tissue, to be followed by fibrosis and scar. If repetition is indulged in, destruction of the scar tissue with necrosis follows."

The Harvard University Medical School Commission[9] on the treatment of **Cancer**, in its report, states that in a limited number of

malignant growths radium treatment seems to be curative, and even when not so, amelioration in symptoms occurs. The best results are in certain skin diseases and localized cancers.

It is of interest to study the report by Bumm[10] on his results in **Cancer of the Uterus.** Further experience warranted him in saying that there was nothing in the whole realm of the medical armamentarium that approached radium in its power to produce shrinking of the primary growth, together with inhibition of discharge and hæmorrhage—effects that usually became apparent in from ten to twelve days. Microscopic evidence in such cases showed a disappearance of malignant mitoses, and ultimately only fibrous tissue remained, with the débris of carcinomatous tissue embedded in it here and there. This report is based on 108 cases, and generally speaking the older the subject the better the prognosis ; in 10 cases preliminary radiation had rendered an operation possible. An important point insisted upon was that it is a serious mistake to imagine that the greater the dosage the better the ultimate result. He found himself constantly diminishing the weight of radium employed, and now used not more than 50 or 60 mgrams at a time. Further, the conclusion was arrived at that radium, mesothorium, and x rays were all equally valuable, and that x-ray treatment properly applied gave just as good results as radium. (*See also* UTERUS, CANCER OF.)

Legueu[11] reports a case of inoperable **Urethro-vaginal Cancer** which remained cured two years and a half after radium treatment. In a discussion on this case Delbet counselled caution in estimating the value of such treatment in cancer of the cervix, pointing out that the penetrating power of a tube of 5 cgrams is not more than one inch, and it is therefore difficult to see how radium can effect a cure in growths penetrating to any depth. All cases treated in his clinic which he had been able to follow up for an adequate period, had died.

The employment of radium in the treatment of **Cancer of the Prostate** is advocated by Pasteau and Degrais[12] in a lengthy communication dealing fully with the whole subject. It is pointed out that surgery holds out almost no prospect of success in these cases, and that histologically the structures are such as are particularly susceptible to the influence of radium. Full details are given as to the technique and the instruments required, and as to how the growth can be attacked through the bladder, rectum, and urethra. Many cases are quoted fully, with complete histories, and details of treatment and after-results. The authors recommend the urethral route by means of a No. 17 gum-elastic catheter with only one orifice at the distal end. The radium tube is fixed by wire at the neck of the catheter, and when it is introduced urine can flow past the radium. Large amounts are used—as much as 5 cgrams of the sulphate, screened with silver tube 0·3 mm. in thickness. Good results are claimed.

As the result of his experience of the treatment of a large number of cases of **Cutaneous Epithelioma,** Schuyler Clarke[13] recommends,

wherever possible, the single or 'massive dose' of radium. He arrived at this method from his experience of the results of massive doses of *x* rays in similar cases of cancer, and is sure that recurrence is less likely than after multiple small doses. He gives 22 cases in full, and while 3 refused to heal and 3 others recurred after treatment by small repeated doses, all those treated by the single massive dose were cured and remained so. He aims at a pronounced reaction, which he claims is comparatively painless. The cosmetic results are at least equal to those of any other form of treatment.

Other papers worthy of reference are two giving the personal results and observations of the authors over a large series of cases of all kinds treated with radium. Aikins[14] deals with 387 cases, and most noticeable is the success he reports in the treatment of **Goitre.** Out of 10 cases of the exophthalmic variety, the improvement was most gratifying in 7 ; the nervous symptoms disappeared and the size of the gland diminished remarkably, in one case as much as four and a half inches in the circumference of the neck. Of 6 cases of simple goitre, considerable reduction in size took place in 4. Newcomet[15] has treated 100 cases, and is enthusiastic as regards the results in uterine cases, and in carcinoma in and about the mouth. This author calls special attention to the fact that the good results have been accomplished with very small amounts : from 1 to 20 mgrams of radium, with little filtration when the condition was superficial, and with 1 mm. lead in deep radiation.

The action of radium in **Splenomegaly** is described by Schuller[16] who used it or mesothorium or rademanit in several cases, in some of which *x*-ray treatment had failed or ceased to be beneficial. Four applicators were used in each case for five to twelve hours at a time, the dose being repeated in two to four weeks according to the skin reaction. The dose was equivalent to 150 to 500 mgrams of pure radium. Improvement followed in all cases at once, and sufficient time has elapsed to be sure of the beneficial result in 4 of his 9 cases.

Simpson[17] reports a case of **Blastomycosis** at the inner canthus of the eye cured by radium. The diagnosis was confirmed by the microscope. A radium varnish applicator, containing 0·04 gram of radium-barium salt, was applied for three hours in fractional doses extending over three weeks, and again for fifteen minutes a few weeks later. A complete cure with an excellent cosmetic result was obtained.

In order to do away with the risk of incision and opening up of lymph spaces, Haret[18] suggests that *radium should be introduced by electrical means.* The procedure consists in driving the ions from a radium solution into the tumour substance through the superjacent integument. The radium ion passes through the skin with a velocity much greater than that of most other ions, and penetrates to an enormous depth ; in half an hour, with a current of 25 ma. per sq. cm., radium ions will be found at a depth of 9 cm. below the positive electrode. A case of **Recurrent Chondrosarcoma** is reported, with full details, in which the recurrence disappeared and the patient was alive

and well three years later. The author says that it is in sarcoma that the best results are obtained.

Ramsay[19] describes his method of obtaining *radium emanation* (niton), and says that he has always recommended the use of radium in this form as being more economical, safer, and more exact. A simple form of apparatus is figured and described, with detailed instruction as to its manner of use, and the way to collect the emanation in suitable tubes; also the way to measure the exact dose and strength. This apparatus is simple and does not include a pump. It functions admirably, and any workman can be entrusted with it after a few lessons.

A contribution to the question of the results of radium in internal medicine, from Rowntree and Baetjer,[20] enters into the theories, facts, and data as they appear in the literature, and gives short résumés of the results of various workers, tabulated in a simple manner. They then refer to their own results, and, admitting that their experience is small, eighteen cases in all, they express themselves as disappointed. Their patients were treated by the drinking method, and were under observation for periods up to three months. Cases of arthritis deformans, rheumatism, tabes, sciatica, and gout all occur in the series. Some showed improvement, temporary as a rule; many derived no benefit at all.

References.—[1]*Brit. Med. Jour.* 1914, i, 1001; [2]*Lancet*, 1914, i, 1441; [3]*Brit. Med. Jour.* 1914, i, 1; [4]*Ibid.* 113; [5]*Ibid.* 274; [6]*bid.* ii, 9; [7]*Med. Press and Circ.* 1914, i, 251; [8]*Med. Rec.* 1913, ii, 1068; [9]*Lancet*, 1914, i, 927; [10]*Brit. Med. Jour.* 1913, ii, 1546; [11]*Ibid.* 1914, i (Epit.), 63; [12]*Canad. Pract. and Rev.* 1913, 703; [13]*Jour. Amer. Med. Assoc.* 1914, i, 1453; [14]*Canad. Pract. and Rev.* 1914, 535; [15]*Jour. Amer. Med. Assoc.* 1914, i, 1453; [16]*Arch. Röntgen Ray*, 1914, ii, 195; [17]*Ibid.* i, 463; [18]*Ibid.* ii, 68; [19]*Lancet*, 1914, i, 1481; [20]*Jour. Amer. Med. Assoc.* 1913, ii, 1438.

ELECTROTHERAPEUTICS.

A complete account of *diathermy*—its production and use in medicine and surgery—is to be found in the papers of Cumberbatch.[1] The therapeutic action of these electrical currents and their physiological effects are the result of the 'chemical' or the 'thermal' changes which they produce in the living tissues. The body offers a high resistance, and heat will be developed if it is traversed by a current of sufficient strength; and what is of importance is the fact that when any part of the body is included in an electrical circuit the current traverses all the tissues, superficial and deep, between the points of entry and exit. This special property—the power of heating the deep tissues—distinguishes the electrical current from all other methods of heating the body, as the latter heat the skin only. After an historical note, the author deals with the high-frequency and diathermy apparatus, and the diagrams and text are fully descriptive and complete. Following this is an account of the methods of application to the body, and the question of medical and surgical electrodes is dealt with in detail. The diathermy current itself, its properties and

mode of action, are explained, and a number of experiments are detailed which illustrate the various points. This paper is a valuable contribution to the subject, and should be of service to anyone who requires a complete and at the same time simple description of the method.

Two other papers dealing with the same subject are by Zimmern[2] and Lewis Jones,[3] and may be read with the above. Jones, after describing the apparatus and its mode of application, deals with certain of the conditions in which it is of use, laying special emphasis on its value in **High Arterial Tension** and various circulatory disorders, **Sciatica, Joint Affections,** and **Neuritis** and **Neuralgia.**

Lewis Jones[4] describes a new apparatus for the routine of *muscle testing*. A condenser of known capacity is charged and then discharged through the muscle. Twelve different capacities are used, varying from 0·016 to 2 microfarads, and these afford a ready recognition of twelve degrees of muscular excitability. A suitable means of charging the condensers from the mains and discharging them through the patient is provided by means of a metronome driven by clockwork. The apparatus is portable. Cumberbatch has given this method a trial for a year, comparing the results with testings by the old method, and found it much less painful to the patients, a great advantage, especially with young children. It also allows of the recognition of many different degrees of degeneration, and the electrical stimuli can be standardized and measured both in intensity and duration. Details of the results obtained in the same cases are published and compared, and the new method gives much greater accuracy.

Bergonié[5] gives an interesting and minutely detailed account of his treatment by passive *ergotherapy* for **Obesity.** The essential principle of the method is that the whole musculature of the body shall be stimulated by appropriate electrical excitation, to painless, rhythmic, and—so far as the nervous system is concerned—passive contractions. The current employed is faradic, and is applied by twelve large electrodes adapted to various parts of the body, having an area of as much as 10,000 sq. cm. The loss in weight is remarkably rapid, and charts extending over a period of three years show it to be permanent.

Cerebral electrization was the subject taken by Leduc[6] for an address to the electrotherapeutic section of the British Medical Association at Aberdeen. He considers that the endocranial organs—contrary to what has generally been believed—are easily accessible to electric currents, and that their action is quite free from danger. Contrary to the action on nerves, which is immediate, the brain exhibits prolonged reactions long after electrical stimulation has ceased. One can produce typical epileptic attacks, showing the stages of tonic and clonic spasm, and the subsequent sleep. The continuous form of current is the best, and definite rules for its application can be laid down. The strength should be very gradually increased from zero to 20 or even 30 ma., the tolerance of the patient being the guide; it should be kept at its maximum for half an hour, and then

gradually diminished. The author has proved its utility in all the **Changes of Cerebral Nutrition,** and in **Inflammation of the Brain** subsequent to lesions such as hæmorrhage, thrombosis, embolism, and contusion. It has also brought about improvement in psychical and physical defects, in **Psychasthenia, Mental Depression,** and **Cerebral Neurasthenia.** He has often seen patients regain their capacity for work and the power of doing business after a few sittings.

Grace[7] records twelve cases of **Painful Shoulders,** some due to such causes as neuritis of the nerve trunks and rheumatoid arthritis, and others in which no cause for the pain could be ascertained, which were treated by a combined method of exposure to a 500-c.p. lamp for twenty to thirty minutes, and subsequent use of the static discharge, a pliable metal electrode being moulded over the shoulder and connected to the positive pole of the static machine, the negative pole being earthed. The author is of opinion that in these cases some definite painful point is always to be found, and can be localized by electrical methods. Nine of the cases treated showed a complete cure ; all improved, one only slightly.

[In our experience ' painful shoulders ' are never due to ' neuritis of the nerve trunk,' and very rarely to ' rheumatoid arthritis ' ; they are usually due to urates deposited in the joint undergoing chemical change, a condition usually represented by the word ' gout.' The application of a high temperature is likely to do good in such cases.—Editor M. A.]

Ionic Medication.—Connell[8] treats primary and secondary **Syphilitic Ulcers, Gummata, Soft Sores, Septic Buboes** (after operation), and **Gonorrhœal Rheumatism** by ionic methods. In syphilitic lesions, which he treats by ionization with a mercurial salt, the best results were obtained in those cases where there was no secondary infection. In a mixed infection the healing process was slower, though great improvement was noticed at first, owing probably to the destruction of the spirochætes. All sores occurring in a syphilitic patient are not syphilitic in origin : often they are septic ; hence, if mercury ionization fails, zinc, iodine or chlorine ions may give good results. Many of the cases treated had received injections of neosalvarsan, but the improvement followed so rapidly on ionization that it left no doubt as to its cause, while many cases which had resisted neosalvarsan healed under mercuric ionization. The technique is as follows : The ulcer is thoroughly cleansed, a solution of cocaine 5 per cent is applied if necessary, and layers of lint soaked in a 2 per cent solution of mercuric perchloride are laid on. The active electrode is of zinc, and the positive pole of the battery is employed. The current strength should be 2 to 4 ma., continued for not more than five minutes at first. This may be repeated every three or four days. The first effect is a rapid diminution of the pain, noticeable the first night after treatment. On the fourth day the ulcer usually has the clean and flat appearance of a healing sore. For gummata, whether broken down or intact, the iodine ion was found useful, while in non-syphilitic

ulceration, zinc sulphate 2 per cent was used instead of the mercurial salt, the technique being otherwise much the same.

Somerville[9] records good results in the treatment of **Neuritis** by ionization with sulphate of quinine, and also by the high-frequency current. He uses in the ionic treatment 30 layers of lint soaked in a 2 per cent solution of sulphate of quinine, a current strength of 50 to 100 milliamperes continued for thirty minutes, and repeated daily.

Hugo[10] is of opinion that **Eustachian Stenosis and Catarrh** are very suitable conditions for treatment by ionic medication, and has had good results. He describes his technique and the instruments he has devised for overcoming some of the difficulties he met with when starting this work. In stenosis of the canal, after passing a Eustachian catheter, a stilette with a probe-pointed zinc terminal is introduced, and so adjusted that when in position the zinc projects $\frac{1}{8}$ in. In all the instances in which this method was used there followed improvement, often very marked. Further, in **Pyorrhœa Alveolaris,** zinc ionization has been so successful that this writer considers that the disease has to a large extent lost its terrors.

Friel[11] describes his technique for ionic medication with zinc applied to the **Diseases of the Middle Ear** and the **Sinuses of the Nose.** The cases treated included chronic suppuration of the middle ear, empyema of the frontal and maxillary sinuses, and nasal catarrh. If ionization is going to do good, he asserts that it does so at once, and improvement should be rapid. The cavity is at first flushed out to remove discharge, and then filled with a warm solution of zinc sulphate. The method suitable for affecting this will vary with the sinus under treatment. The current employed should not exceed 2 or 3 ma. in the case of the ear, increased and diminished slowly, otherwise faintness and vomiting may occur. In **Ozæna** the method is applicable, but is not at all times curative, and in one case which did not improve by ionization, an intravenous injection of a killed culture of Friedländer's bacilli combined with ionization brought about a rapid result. He is of opinion that ionization and vaccine therapy are not antagonistic but supplementary, and indicates the considerations which should guide the choice between them.

References.—[1]*Arch. Röntgen Ray,* 1914, ii, 54, 99, and 122; [2]*Med. Press and Circ.* 1914, i, 8; [3]*Lancet,* 1914, i, 375; [4]*Proc. Roy. Soc. Med.,* Elect.-ther. Sec. 1914, 38; [5]*Arch. Röntgen Ray,* 1913, ii, 250; [6]*Ibid.* 1914, ii, 160; [7]*Brit. Med. Jour.* 1914, i, 1012; [8]*Ibid.* 138; [9]*Ibid.* 1014; [10]*S. Afric. Med. Rec.* 1914, 207; [11]*Arch. Röntgen Ray,* 1913, ii, 213.

Part II.—The Dictionary of Treatment.

A REVIEW OF MEDICAL AND SURGICAL PROGRESS FOR 1914. BY MANY CONTRIBUTORS.

Together with a brief Synopsis of Treatment recommended during recent years.

GENERAL REVIEW.

Abdominal Surgery.—Perhaps the most definite advance in this field is the wider application of the operation of splenectomy. This is considered under several headings dealing with diseases of the spleen. Apart from this, there is no striking innovation to record, but the surgical attack on abdominal disease is everywhere achieving better results, thanks to improvements in technique. Of particular interest at the present time is the paragraph on Abdominal Injuries.—[Ed.]

* * * * *

Anæsthetics.—The meeting of the International Congress in London in 1913 marked a new era in the study and practice of anæsthesia, for a section dealt purely with this branch of work for the first time in the history of these Congresses. Presided over by Dr. Dudley Buxton, the discussions covered the ground in a very complete manner, and all recent advances in anæsthetic work may be studied by a perusal of the proceedings. Naturally, matters have moved forward during the months since that date, and the claims of the pioneers as expounded to the Congress have to a considerable extent been either substantiated or shaken.

Of the newer methods, intravenous administration would appear to have made little advance, and may be best regarded as showing its highest value in cases in which the administration of large quantities of fluid by the veins is in itself desirable, altogether apart from the question of anæsthesia. In ordinary cases this large addition of fluid to the circulating blood is not without its own dangers, and œdema of the lungs has been definitely attributed to the infusion on more than one occasion. On the other hand, in cases of severe shock and of long and severe operations, intravenous infusion is generally of great advantage, and in head cases, if the anæsthetist prefers, the anæsthetic may well be given in this manner. Neither hedonal nor isopral appears to meet with continued favour, and if intravenous infusion is employed, ether in a 5 to 7 per cent solution in normal saline should be used.

Another route for the introduction of ether which, although tried and abandoned some years ago, has recently been introduced again, is that per rectum. The conditions for success by the method of rectal infusion have been studied, and it is claimed that the danger and inconvenience which formerly prevented such measures from being widely used have now been satisfactorily combated. The investigations and experiments necessary on this subject have been made in America, and the conclusions there arrived at have not yet been widely tested in this country.

The intratracheal administration of ether vapour has definitely established itself as a method of the highest value in certain cases. Here the selective value of widened experience is being demonstrated, and we are learning that though the method is unrivalled for intrathoracic surgery and for many cases of operation about the face, mouth and throat, yet for routine use in abdominal and other operations it is not preferable to, if indeed the equal of, the simpler methods in vogue.

The use of alkaloids, particularly morphia and atropine, before and in conjunction with the administration of general anæsthetics, has so far established itself that it is now with many anæsthetists a routine procedure. Scopolamine is on some hands highly extolled, on others equally vehemently condemned, and the same may be said of the employment of omnopon, which the present writer has used largely and with gratifying results.—[J. B.]

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Cancer.—In a series of articles on malignant disease of the bladder, breast, lip, tongue, and so on, the principles which guide modern surgical treatment are applied to the differing tasks which the disease presents according to the organ affected. The writer shows that success depends almost entirely on realization of the pathology of the condition which has to be treated.—[Ed.]

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Dermatology.—There is no event of outstanding importance to record in dermatology during the past year. The outbreak of the European war cancelled all idea of International Congresses, and has practically abolished interchange of scientific thought between the warring nations.

The possibility of a wider dissemination of pellagra in the British Islands than has been realized either by the medical or lay public, is suggested by the numerous instances of the appearance of this disease in which the cutaneous manifestations are the most diagnostic features. The importance of familiarity with its skin symptoms is therefore considerable, and two illustrations of these appear in the text.

The share of the internal secretions in influencing skin disorders is an ever-widening one, and much attention has been directed to the

subject. In alopecia, which still remains of unsettled etiology, there is some additional evidence (mentioned in the text) pointing to the influence of the sex glands, as well as to the well-established effect of hypothyroidism. Partial experimental ablation of the pituitary body is followed by certain cutaneous changes, as well as by the addition of fat. The skin becomes dense, dry, and less movable than usual. The hair becomes bristly and tends to fall out in patches. —[E. G. L.]

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Diseases of the Ear, Nose, and Throat.—The treatment of the Eustachian tube under the direct control of vision is now being carried out by certain surgeons, but has not as yet been generally adopted. Ionic medication in suppurative otitis media, and in affections of the nose and accessory sinuses, may also be mentioned. The pathology of ozæna and the use of vaccines in this condition have received considerable attention. In regard to the treatment of nasal accessory sinus disease, there is a tendency to abandon external operation in favour of intranasal measures. Inoperable growths in the pharynx may in some cases be greatly benefited by the use of diathermy or radium. The main advance in laryngology has been the further development of the suspension method of examination and treatment.—[J. S. F.]

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General Medicine.—Perhaps the most interesting among the many problems that the student of internal medicine has yet to solve is that of the relation between certain of the obscurer forms of splenomegaly. Under this heading, and also under that of Banti's disease, much interesting information is collected in the present volume. The possibility of treating pernicious anæmia by splenectomy is considered, but with an adverse verdict. Rheumatoid arthritis, a rock of offence to therapeutics, has been discussed by many writers, whose experiences are briefly summarized here.—[Ed.]

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General Surgery.—The mass of literature dealing with surgical matters is more bulky than ever. It is remarkable how much of this is concerned with the treatment of injuries and diseases of bones and joints. The field of operation in the treatment of fractures is especially considered at length. The topic of the day, gunshot injuries, finds its way into the paragraphs of general surgery, as well as into the articles specially devoted to this subject. The question as to what part surgery should play in the treatment of diseases of the thyroid gland is still under discussion, and the modern surgeon's position is summarized in this volume.—[Ed.]

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Diseases of the Heart and Blood-vessels.—The application of physiology to clinical medicine continues to enlighten the study of cardiovascular disease, yet nothing of striking practical import has emerged during the year. Of the various discoveries that are likely to open the road for clinical progress, two may be noted: the fact that there is more than one muscular strand connecting auricle with ventricle; and the part played by some kind of acidosis in causing the paroxysmal dyspnœa of cardio-renal disease.

On the practical side many observers are striving to find some arithmetical term in which the cardiac efficiency may be accurately stated, but without any general agreement so far. The study of arterial tension by auditory methods, and the exact significance of minimal or diastolic pressure, are matters that have received much attention. The importance of rheumatic heart disease as a clinical and pathological entity appears to be impressing itself on the mind of the profession.—[C. C.].

* * * * *

Acute Infectious Diseases.—The most interesting subjects which are dealt with in this volume are the small-pox epidemic in Sydney during 1913, certain epidemics of tonsillitis and adenitis, and outbreaks of jaundice.

Authentic accounts of the first, show that small-pox of a very mild type may prevail even amongst the unvaccinated, and that under such circumstances it will give rise to considerable difficulty in diagnosis. As for the epidemics of tonsillitis, the chief point to note is that many of the cases were of some severity, and cardiac complications occurred. Tonsillitis is usually looked upon as a trivial affection, but when epidemic it is prone to be serious. In respect of epidemic jaundice, recent evidence goes to show that there are two varieties of it, Weil's disease and epidemic catarrhal jaundice. Possibly also the latter may be subdivided into two classes. The sporadic cases of so-called catarrhal jaundice which are so frequently met with are perhaps solitary instances of epidemic catarrhal jaundice.—[E. W. G.]

* * * * *

Mental Diseases.—An increasingly scientific tone is apparent in the literature of insanity. The exhaustive histological researches of Shaw Bolton are alluded to at length in the present volume, and some attention is devoted to a consideration of the psycho-analytic methods of Freud. An account of work done at the new Boston Psychopathic Hospital serves to demonstrate the great value of such institutions for the investigation and treatment of mental disease. Attention is also directed to the treatment of general paralysis by salvarsanized serum.—[Ed.]

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Ophthalmology.—However small the percentage of unsuccessful cataract operations may be in the practice of any single operator, it is the constant effort of all alike to reduce it still further, and therefore the discussion on post-operative complications of cataract which is summarized in this volume should be of wide interest.

A large part of current ophthalmic literature is still devoted to problems connected with glaucoma.

In the existing state of the world, ophthalmic in common with general surgeons are specially interested in injuries, and in this connection the latest views on the pathology and treatment of sympathetic ophthalmitis are important. They will be found summarized under the heading Eye Injuries.—[A. H. T.]

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Pædiatrics.—There is little new to be recorded concerning the artificial feeding of infants, but the teaching of Finkelstein, Czerny, and Keller still commands considerable attention, especially in the United States. Views are as divergent as ever as to the relative importance of heat, improper feeding, and infection, in the etiology of epidemic diarrhœa. Workers at the Boston Floating Hospital have contributed the results of their investigations, which show that the organisms found in the stools vary in different years, although the clinical pictures of the disease are not dissimilar.

The etiology and proper treatment of hypertrophic stenosis of the pylorus remain subjects of dispute. Equally good results are claimed for medical and surgical treatment. It would appear from the experience of most physicians that, whilst many cases recover under medical treatment alone, recourse to surgery is indicated in the more severe.

Attempts have been made by means of the Wassermann reaction to show whether there is any relation between infantile marasmus of indefinite origin and inherited syphilis. No connection between the two has been established. On the other hand, further evidence has been forthcoming to demonstrate the frequency with which mental deficiency and a positive Wassermann reaction occur together in the absence of definite syphilitic stigmata. The results of treatment of inherited syphilis by salvarsan and neo-salvarsan are rather more encouraging than heretofore, but mercury is still generally regarded as an essential part of the treatment. More careful dosage and improved technique have materially lessened the dangers of the newer remedies.

Further experience with transfusion and the hypodermic injection of human blood-serum in the treatment of the hæmorrhagic disease of the new-born has been very satisfactory. Injection of human blood into the child's buttocks is also said to have been attended with good results.

From recent investigations in Edinburgh it appears that, in that city at any rate, the source of infection of tuberculous glands in the

neck is generally cow's milk, the tonsils acting as the portal of entry for the bovine bacillus.

The nature and importance of status lymphaticus continue to excite much interest, but the problem of its diagnosis is no nearer to solution. The pathological appearances on which its claims to be considered as a distinct morbid state are based, have been described in cases of fulminant pneumonia and appendicitis, and in scrofula, and have been held to explain the unusual course which the infection takes in these conditions.

Radiography is playing a greater part in the diagnosis of children's diseases than formerly ; a special appearance is described in infantile scurvy. It is also being utilized extensively in the diagnosis of tuberculous thoracic glands and of early tuberculosis of the lungs. Some consider it of great value both in the recognition of hypertrophic stenosis of the pylorus and in determining the amount of obstruction present in that affection.—[F. L.]

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Pulmonary Diseases.—Apart from a paragraph on that interesting condition, massive collapse of the lung, the subjects that receive most attention this year are tuberculosis of the lungs and pneumonia. In connection with the latter, several writers have reported fully on their experiences with vaccines and sera. The diagnosis of bronchial tuberculosis is considered, also the value of tuberculin and other methods of treatment of consumption. Among these, the treatment by induction of artificial pneumothorax is discussed at length.—[Ed.]

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Tropical Diseases.—In the paragraph on amœbiasis, the value of the emetine treatment receives ample confirmation, in relation both to the intestinal and to the hepatic forms of the disease. Investigation into the causation of pellagra is proceeding, but without any very definite result as yet. There are several paragraphs relating to diseases described for the first time ; and promising advance in regard to leprosy, malaria, plague, and cholera is also recorded.—[Ed.]

* * * * *

Urinary Surgery.—Bier's method of treating tumours of the bladder by means of the high-frequency current is discussed in a few articles. This plan claims an increasing number of adherents.

Pyelography, as a method of diagnosis, its value, after-results, and dangers, has received the attention of a large number of observers. A special review is devoted to this subject.

Nephroptosis and nephropexy are the subject of discussion. No important advance has been made in our knowledge of this method.

A number of articles deal with the indications and results of suprapubic prostatectomy and with diseases of the seminal vesicles, prostate, and verumontanum.—[J. W. T. W.]

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VENEREAL DISEASES.—Mercury is regaining its position as the fundamental drug in the treatment of syphilis, while arsenic, which has recently attempted to usurp its place, has retired to its original position as an auxiliary form of medication. As regards the new arsenical preparations, it is claimed that *galyl* and *ludyl*, the latest products of Mouneyrat from France, are equal in therapeutic effect to salvarsan and neosalvarsan, and free from the frequently fatal toxic effects of the latter drugs. Further experience with galyl and ludyl is necessary in order to substantiate these claims. At any rate, they have the advantage of not being made in Germany.

As regards the Wassermann reaction, the latest opinions incline to the view that, while a useful aid to diagnosis, it is of little value in prognosis or as a guide to treatment.—[C. F. M.]

ABDOMINAL INCISIONS. *E. Wyllys Andrews, M.D. (Chicago).*

Drüner[1] advises a new form of incision, which he calls bow-shaped, for access to the epigastrium (*see Fig.* 4). It is placed midway between the ensiform and umbilicus, transversely, with the convexity upward, and has been found useful in stomach operations, and also in certain types of gall-stone operation. It is claimed that it gives freer access to this field, and allows a more perfect closure, and that there is less danger of ventral hernia following its use. It is based upon the idea of Kocher, that the innervation of the body is less divided by transverse incisions. After making the transverse cut in the anterior rectus sheath, one of the rectus tendinous bands is divided, also transversely. The posterior rectus sheath is then cut across, and the reverse order is used in the closure.

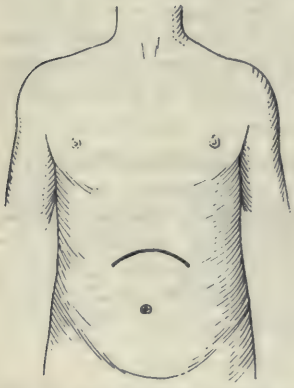

Fig. 4.—Drüner's incision for access to epigastrium.

Moorhead[2] advises a modification of the pararectus incision, with the idea of obtaining, first, requisite exposure with minimum structural damage; second, protection against hernia. Starting with the premise that the McBurney or gridiron incision is still of value in the lateral regions, this has a limited application. Deaver has already advised entering through the split rectus muscle. Moorhead advises a vertical incision internal to the rectus margin. The fascia is then retracted to a point near the middle line, where the muscle is split by separating its fibres. The rectus muscle being then drawn apart, the posterior rectus sheath is divided at a point not opposite the muscle incision. This incision is very safe against ventral hernia, as the various lines of suture are not superimposed.

A new incision for approaching the gall-bladder has been advised by McArthur,[3] which seems to have great value in preventing hernia, and at the same time gives wide access to the field. The writer calls attention to the difficulty often experienced in closing the posterior sheath, which prolongs the operation, the anæsthesia, and shock. The transversalis, whose fibres and tendons constitute the posterior sheath, is an active respiratory muscle, and with each respiration pulls on the suture. To obviate this difficulty, McArthur makes a small opening first to confirm the diagnosis by digital exploration, as his incision is suitable for gall-bladder surgery only. The incision may then be enlarged to the middle line, and as far laterally as seems essential. Having divided the outer layers, the transversalis, instead of being cut vertically from the posterior rectus sheath, is separated in the direction of its fibres, thus creating an opening nearly at right angles to the skin incision. The cut margins of the transversalis are seen to lie in contact, and its respiratory action is reported as continuing normally. This cut can be closed easily with catgut sutures under no tension. A refinement in the separation of the muscle fibres of the rectus, after cutting its sheath, can be made by blunt cleavage from the mid point of the incision with the handle of the scalpel.

References.—[1]*Centr. f. Chir.* 1914, 841; [2]*Ann. Surg.* 1913, ii, 282; [3]*Surg. Gyn. and Obst.* 1915, i, 83.

ABDOMINAL INJURIES. (*See also articles on* War Surgery.)

E. Wyllys Andrews, M.D. (Chicago).

Kanavel[1] has reported cases of *extraperitoneal rupture of the duodenum.* The writer believes that a toxæmia other than bacterial is a factor in the mortality of extraperitoneal rupture of the duodenum. In Kanavel's case the fact that there was something different from the ordinary type of death from peritonitis was evident. The appearance of the patient was almost suggestive of delirium tremens, or more of an active toxæmia. There was no positive peritonitis, no vomiting, and the bowels moved freely.

A study of the literature served to emphasize the high mortality in rupture of the duodenum, partly due to inability of the surgeon to suture these ruptures by exposure after Kocher's method. In the author's first case the duodenum was mobilized through an incision in the posterior colic mesentery to the right of the duodenum. This proved easier than had been expected. A study of other cases shows that the extraperitoneal rupture especially, is rarely discovered at operation: 64 cases of all types of duodenal rupture included 28 with operation, and in 6 of these the rupture was only found post mortem; 24 cases from various London hospitals, reported by Berry and Giuseppi, showed that 13 patients had been operated on, and the rupture discovered in 7 only, while in 6 it had been overlooked and found post mortem. In fact, practically all the cases discovered during operation were intraperitoneal ruptures, an error which would have

been avoided by routine examination and, if necessary, exposure of the third portion of the duodenum. Experience and judgement teach that an immediate laparotomy is indicated in all cases in which there is any probability of rupture, and in the ordinary case the general principles of intestinal surgery should be followed. In rupture of the duodenum, however, there are several factors to be considered: first, the possibility of overlooking the rupture; second, gangrene of the loop; third, probability of retroperitoneal infection; fourth, the fact that the sutured bowel has no peritoneal covering; fifth, the probability of toxæmia from duodenal and pancreatic secretion.

The mortality of these cases has been much higher than of rupture of other parts of the intestine. Now that the surgeon is alive to this possibility, the mortality may be lessened. In operating, the first and second portions of the duodenum may be exposed by Kocher's method, and the third part can easily be treated by the mobilization he has advised. Although both the writer's cases ended fatally, it seems probable that, when forewarned of this condition, some of those occurring in the future may be saved.

Collinson and Braithwaite[2] report a different method of treating traumatic rupture of the duodenum, namely, the use of gastro-enterostomy and division of the duodenum at the duodeno-jejunal junction. Moynihan reported a partially successful case treated by this method in 1901. One hundred and four days after the operation, the patient was suddenly seized with acute abdominal pain, and died in an hour. Post-mortem examination showed a perforation of the duodenum at the lowest point of the loop, this being due to the button, which lay in an ulcer which pressure had produced. Collinson's case was that of a girl, age 17, whose duodenum was torn during removal of an abdominal tumour; the laceration on its posterior aspect was found to be extensive, so an efficient closure could not be made, and it was decided to resect the torn portion of the gut. The duodenum being closed, the jejunum was attached to the posterior wall of the stomach. The patient made an uneventful recovery. Braithwaite's case was that of a patient who had increasing constipation, with attacks of abdominal pain, gradually ending in complete intestinal obstruction. A small movable growth was found near the splenic flexure, and there were no secondary deposits. After some consideration, it was decided to resect the duodenal flexure, together with parts of the colon to which it was attached by a growth. It was impossible to perform either an end-to-end or lateral approximation of the duodenum. The incision into the duodenum was therefore closed by suture, and a posterior gastrojejunostomy was made. The *x*-ray examination showed the gastro-enterostomy functioning well, the stomach being emptied in four and a half hours. The patient made a good recovery.

Knaggs[3] also discusses traumatic rupture of the duodenum. Retroperitoneal rupture of the hollow viscera, it is obvious, can only occur in the duodenum and in certain parts of the large bowel, as all the

other hollow viscera of the abdomen have true mesenteries. The duodenum, owing to its fixed position in front of the spine, is particularly prone to rupture in severe abdominal contusions. In the anterior wall the rupture communicates with the general peritoneum, in the posterior wall with the retroperitoneal connective tissue. As the latter is weaker, from the absence of peritoneum, it might be supposed it would be more likely to tear ; but statistics show that anterior ruptures opening into the peritoneum are more frequent. We should also distinguish between retroperitoneal and subperitoneal or partial rupture of the bowel, covered by serous membrane. Knaggs's two cases both occurred in football players struck by the knee of an opponent during a match. In both cases laparotomy was performed, but death ensued in both. There was no general peritonitis, but infective extravasation into the retroperitoneal tissue.

Barnes[4] reports a case of *traumatic rupture of the normal spleen*. (*See also* SPLEEN, SURGERY OF.) Before 1874, the mortality of splenectomy was 90 per cent, due to faulty technique. Recent statistics include cases from nearly all lands. Neck, in 1905, gives 73 cases of uncomplicated rupture, with a mortality of 37 per cent. Barnes's patient fell twenty-five feet, and was brought unconscious to the accident room. He had also Colles's fracture of the left wrist and abrasions of face and chest. The abdomen was negative at first. The next day he had pain in the left lower abdomen and left inguinal region, and the muscles were rather tense. Otherwise the abdomen was still negative. There were no signs of fluid and no vomiting ; temperature and pulse were normal. On the second day, there was a sudden change for the worse, with vomiting, severe pain, and abdominal rigidity. Tenderness was localized low down in the left iliac region. The abdomen was opened and a quantity of dark blood removed. The lower third of the spleen was found shattered into a pulpy mass, surrounded by blood-clots, with profuse general oozing. After ligating the pedicle and removing the blood, the abdomen was closed with a small drain. After the first twenty-four hours, recovery was uninterrupted. Five months after injury the patient was well, with no hernia. In this article Barnes has collected all cases reported from 1909 to 1913, 31 in all : 26 were treated by splenectomy, with 2 deaths—mortality, 7·6 per cent ; 4 treated by tampon and 1 by suture, with no deaths. The mortality in unoperated cases is 94 per cent in normal spleens, and 90 per cent in those with splenic disease. In St. Bartholomew's Hospital Museum there are two specimens of spontaneously healed lacerations of the spleen. The technique of operation includes median incision, preferably under local anæsthesia, as the diagnosis is uncertain. Resection of the lower rib cartilages has been recommended by Aubray, but it is probably not necessary, unless the spleen is enlarged. The exploration should be early in all cases.

The question of opening the abdomen for *penetrating gunshot wounds* is discussed by Laurent,[5] of Brussels. Extreme difficulty

surrounds the treatment of such cases on the field, since the circumstances are not so favourable to surgery as those in large hospitals. The soldier wounded in the abdomen must be carried to the first-aid station and then to some field hospital. As non-operative treatment has been advised by high authority, it is stated by Laurent that the mortality of this management is not certain. In the Spanish-American War, 51 per cent died under non-operative measures. Other authorities give the mortality as 70 per cent in gunshot wounds and 90 per cent in shrapnel wounds. One of the most notable points in the spontaneous recovery from perforating wounds of the intestine is the ability of the mucous layer to obstruct small openings. Various writers have noted this fact, and it explains why recovery sometimes occurs without operation. Cheatle made an autopsy on a wound penetrating the lumbar region and lodging near the anterior superior spine, the patient dying in twenty-four hours. The projectile had traversed the cæcum transversely as far as the posterior wall, and then had injured the sacro-iliac joint. The difficulty of closing the perforation deep in the pelvis might have made successful operation impossible. For diagnosis, pain is perhaps the most important symptom. Rigidity of the abdominal wall comes next in importance; but the safest operation is one made before either of these symptoms has developed. Hæmorrhage has been a very alarming feature in many of the reported cases.

Lucas-Championnière, Reclus, Pozzi, and other surgeons, in discussing this paper, advised conservatism, excepting when a patient can be treated early in a modern hospital. The writer, Laurent, having had a large experience at the siege of Adrianople, also at Alexandria and Sophia, has seen an unusual number of these injuries, some 58,000 wounds of all sorts having been reviewed by him. He advocates laparotomy for exploration when this can be done early, especially in the first six or eight hours. Certain Bulgarian reports, included in his observations, seem to confirm this. One advantage of early incision is that it saves certain cases from dying of hæmorrhage when done only a few hours after the injury; but the operation may be contra-indicated when peritonitis is well established or severe shock is present, with or without hæmorrhage. However, in favourable cases of suture of the intestine or of stomach perforation, ligature of bleeding arteries and ordinary careful exploration will undoubtedly prove life-saving.

Other obstacles to laparotomy in time of war are the great distance from the firing line to the hospital, the loss of time, and the impossibility of transport. It would seem to have been proved by numerous cases, that the abdomen may be traversed by a missile without perforating hollow viscera; also that some cases recover spontaneously in spite of perforation.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, Mar. 7; [2]*Brit. Jour. Surg.* 1914, Apr., 665; [3]*Clin. Jour.* 1914, 65; [4]*Ann. Surg.* 1914, i, 597; [5]*Rev. de Gynécol., etc.*, 1914, 299.

ABDOMINAL PAIN IN CHILDREN. *Frederick Langmead, M.D., F.R.C.P.*

It is often a matter of great difficulty to determine the clinical significance of pain in the abdomen in children. More frequently than in adults it is an indication of disorders altogether outside the abdominal cavity. Its occurrence and its diagnostic importance in diseased conditions situated above the diaphragm, such as pleurisy, pneumonia, and pericarditis, and its association with spinal caries, are well known. Not seldom, too, it forms one of the signs of acute infective diseases, of which rheumatism may be taken as a type; whilst it may be present in an acute form in connection with various forms of arthritis, especially those accompanied by purpura.

H. Tyrrell Gray,[1] in a recent paper, states his belief that *colicky pain* in children is due to an actual lesion in the wall of the intestine or in the mesentery. In his opinion a swelling produced in the bowel from any cause renders the affected area inert so far as actual muscular contraction is concerned, so that this part of the gut is to be regarded as a foreign body. By its contraction the intestine attempts therefore to drive this inert part of the intestinal wall along with its contents, and thus drags on the mesentery attached at this level. The dragging stimulates the afferent nerves and produces pain, the colicky nature of which is accounted for by the relation of its onset to peristalsis. Such swellings may be due to congestion of lymphoid follicles from irritating gastric contents, tubercle, typhoid, and other local conditions. He explains the presence of pain in the abdomen in the course of general infections and toxæmias such as rheumatism, Henoch's purpura, diphtheria, and serum disease, on the supposition that a similar local lesion occurs in them also. He thinks that many of the intestinal troubles of later life owe their origin, in part at least, to intestinal disorders in childhood. These not only arise from unsuitable food, etc., but also from repeated acute or persistent and untreated chronic general infections. As the commonest sources of general infections in childhood are the mouth, teeth, fauces and nasopharynx, together with the secondary infections of the ears and cervical glands: he lays stress on attending to these, as well as to the diet and the local conditions, in the treatment of abdominal pain.

Periodical Spasm of the Descending Colon.—Under this title Hutinel[2] describes a condition in infants in which abdominal pain is an outstanding feature. It may occur in infancy, but has been noticed especially in children from 4 to 15. Both sexes are equally affected. The patients are nervous, and are the children of parents who were subject to joint affections, neuroses, or diabetes. Although their nutrition has often been defective during the first few years of life, many of the babies have been breast-fed. Almost all have suffered at some time from serious alimentary disorders, particularly from recurring colitis. Some are ill-nourished, whilst others may be unduly fat. In spite of the digestive trouble their general condition is not always bad. Generally constipation precedes the attack, the appetite lessens, the tongue becomes furred, the breath foul, and nausea, with

or without vomiting, supervenes. The chief symptom is pain in the left flank, generally confined to the front of the abdomen, but sometimes occurring in the back also. On palpation of the abdomen the descending colon and sigmoid flexure feel like an india-rubber tube, and sometimes the splenic flexure and transverse colon impart the same sensation to the examining fingers. Palpation of the colon often causes considerable pain, but is not so severe as that which precedes the spasm, which is often intense, but relieved by very hot applications or firm pressure. At the end of the attack slimy, blood-stained motions are passed, which may be either hard or soft, but are always very offensive. There is sometimes a slight rise of temperature; the liver is often enlarged, and acetone may be detected in the breath. Urticarial eruptions may be present. The children are restless, distressed, and sunken-eyed. Hutinel recognizes that contraction of the large intestine is a common phenomenon, almost always accompanying colitis and other conditions which irritate that portion of the bowel. The special features which characterize the cases he describes are the sudden onset of the pain, its situation in the left flank, its severity, suggesting renal colic or intussusception, and the suddenness with which it ceases after the evacuation of the fœtid material.

The immediate prognosis is not serious, but the attacks recur, and may become complicated by appendicitis. Later on, the patients may become the subjects of migraine or diabetes.

Treatment.—For the attack, this consists in applying hot **Fomentations** and administering **Belladonna,** either alone or with **Opium.** The diet should be restricted. Gentle **Laxatives** may be given, such as small doses of castor oil or sulphate of soda. The author advises against the administration of calomel. When the attack is over, he recommends **Abdominal Massage** for an hour each morning and the application of large **Cold Compresses.** For the constipation he advises laxatives which act mechanically: injections of **Olive Oil,** or **Vaseline** and **Paraffin, Carlsbad** or **Châtel-Guyon Water,** or small doses of **Castor Oil.** By these means the attacks become less frequent, though one must expect that they will recur from time to time.

E. Morro[3] has described a form of *recurrent umbilical colic* due to nervous causes, to chronic constipation, and to other conditions not ascertained. Küttner,[4] however, believes that this condition, of which the chief symptoms are recurrent and umbilical pain, periodic vomiting, and temporary disturbance of micturition, indicates the presence of appendicitis.

References.—[1]*Pract.* 1914, i, 26; [2]*Presse Med.* 1914, 105; [3]*Berl. klin. Woch.* 1914, 337; [4]*Ibid.* Jan. 26.

ACID INTOXICATION. *Frederick Langmead, M.D., F.R.C.P.*

Too much stress has been laid on the mere presence of acetone in the urine of children, for this substance is found not only in normal children, but also under a great variety of clinical conditions. Some-

times, however, acetonuria and diaceturia constitute two of the signs of an important group of disorders associated with profound metabolic changes at present very imperfectly understood. Into this group fall cases of cyclical vomiting, recurrent bilious attacks, post-anæsthetic vomiting and toxæmia, and probably also the pernicious vomiting of pregnancy.

Abt[1] describes a familial group which appears to be allied to these. It is comprised of cases of a severe form of acid intoxication occurring in children at about the time of weaning, and usually terminating fatally. The illness generally occurs in well-developed healthy infants. In some cases the weight was stationary for a few weeks before the onset. The disease is ushered in by gastro-intestinal symptoms, consisting of more or less diarrhœa and, nearly always, vomiting. The patients are at first restless, and show a slight rise of temperature during the first days of the illness. On the second or third days occur abdominal distention, dyspnœa, and an increased pulse-rate. The respirations are laboured, and aided by the accessory muscles. The liver is considerably enlarged, with rounded edges and a firm surface. The urine soon contains albumin, with hyaline and granular casts but no blood, and acetone and diacetic acid. In one case leucin and tyrosin were found in the urine. Afterwards stupor supervenes and deepens into coma. Towards the close of the disease intestinal atony may occur, so that neither fæces nor gas are passed. Abdominal distention increases, and cyanosis and dyspnœa become marked. Death often occurs four or five days after the onset. The author has notes of nine such cases. He distinguishes them from cases of cyclical vomiting by the early ages of the patients, the slightness of the vomiting, the rapid superficial breathing, the enlargement of the liver, the low temperature and rapid pulse, and the occurrence of tympany and obstinate constipation.

[It is doubtful whether such distinctions can fairly be drawn, for many cases of cyclical vomiting differ considerably from the classical description, and all these features are sometimes present in that disease.—F. L.]

A similar group of cases has been described by T. D. Parke. As Abt points out, the familial character of the condition suggests some inherited defect which leads to derangement of the metabolic processes and the formation of toxic products.

Reference.—[1]*Amer. Jour. Med. Sci.* 1914, i, 86.

ACNE AGMINATA. *E. Graham Little, M.D., F.R.C.P.*

This very rare form of disease, usually regarded as a tuberculide, occurs so seldom that any opportunities for new investigation are to be welcomed. Oliver[1] contributes a good clinical and histological report of a case from the Rigshospital in Copenhagen. The affection began abruptly with deeply-situated cutaneous lesions, consisting of soft papules distributed in symmetrical and single groupings on the face, and nowhere else. The histological examination showed an

infiltration of inflammatory cells arranged chiefly in the deeper layers of the corium about the sweat coils and around some sebaceous glands. There were no lupus nodules. Sections stained for tubercle bacilli and smears from macerated papules, showed no acid-fast bacilli. Inoculations into three guinea-pigs of tissue from papules proved negative as regards tubercle. The author therefore concludes that this affection must for the present be regarded as an infective granuloma of unknown origin, affecting mainly the sweat-coil region of the corium, and with no causal association, that can be supported by evidence, with Koch's bacillus.

The treatment adopted included the administration of small doses of **Arsenic,** and **Curetting** with the sharp spoon of the cutaneous small tumours and with the galvano-cautery of the larger ones. Nine months after, the patient remained free of any fresh eruption.

Reference.—[1]*Brit. Jour. Dermat.* 1914, 439.

ACNE KELOID. *E. Graham Little, M.D., F.R.C.P.*

The name acne suggesting a connection with the familiar disease acne vulgaris, with which it probably has no connection, it is preferable to discard this name, and the disease is better described under the title dermatitis papillaris capillitii. Adamson[1] describes it as follows: It occurs almost exclusively in young adult males, who are generally in good health otherwise, usually thick-necked, and in the habit of wearing stiff collars or neckbands. The eruption is found on the back of the neck in the form of a transverse band at the lower margin of the hairy scalp. The band is usually dusky red, smooth and firm to the touch, in fact of keloidal aspect and consistence. It is hairless except at its upper margin, which is abrupt, broken into nodules, and fringed with hair-like tufts resembling aigrettes or the bunches of bristles in a brush. There may be pustules or crusted nodules here and there along the upper border. The lower margin slopes gradually to the normal skin. Usually there are no comedones nor follicular pustules of acne when the patient comes under observation, and there may or may not be a history of acne of the face in youth. Often the patient complains of itching at the site of the eruption. The disease is very intractable. Histological investigation gives ground for regarding the disease as a connective-tissue growth resulting from chronic inflammation, possibly of combined traumatic and microbic origin, leading to atrophy of the hair follicles and sebaceous and sweat glands. There is no ground for regarding it as related to acne, sycosis, or keloid.

The most effective treatment is by application of massive doses of **X Rays** to the keloidal swelling, care being taken to protect the non-affected parts of the skin. In early cases, small isolated nodules may be **Excised.**

Reference.—[1]*Brit. Jour. Dermat.* 1914, 82.

ACROMEGALY. (*See* Pituitary Gland.)

ACTINOMYCOSIS.

X Rays used in (*p.* 65).

(*Vol.* 1914, *p.* 87)—A case is recorded in which a remarkable cure was effected after other treatment had quite failed, by the use of stock and autogenous Vaccines.

ALIMENTARY TOXÆMIA AND CHRONIC INTESTINAL STASIS.

Robert Hutchison, M.D., F.R.C.P.

So much has been written lately about 'alimentary toxæmia' and 'chronic intestinal stasis,' and so much confusion and difference of opinion exist regarding both subjects, that a general review of them may be useful to those who have not time to study the literature for themselves. It will be convenient to consider alimentary toxæmia first, for it is the alleged consequence of intestinal stasis, and if it did not exist there would be no need to consider the latter at all.

ALIMENTARY TOXÆMIA.

We may define alimentary toxæmia, with Andrewes,[1] as "the absorption from the alimentary canal of chemical poisons, of known or unknown composition, in sufficient amount to cause clinical symptoms, the blood having served as the channel of distribution to the tissues which are poisoned."

The doctrine of self-poisoning from the alimentary canal is no new one, but dates back to the year 1887, when it was first promulgated by Bouchard. It was afterwards elaborated by Metchnikoff and his school, who did much work on the bacteriological aspect of the question, and especially incriminated the colon as the seat of poison absorption. The sour-milk treatment, now fallen into disrepute, was based on Metchnikoff's theories. The doctrine has received extensive and enthusiastic clinical application by Combe and others. In spite, however, of much theorizing on the matter, we are still largely in the dark as to the chemical nature of the poisons or toxins which are supposed to be absorbed.

There are three possible sources of such poisons: (1) The ultimate products of the splitting up of proteins by the digestive ferments; (2) Bacterial ectotoxins and endotoxins; (3) Products of the action of bacteria on proteins or on the bodies split off from them in digestion. Let us consider these separately.

1. *The products of the digestion of proteins*, e.g., albumoses and peptones, are certainly toxic if injected into the blood-stream, and have long been known to be so. It must be remembered, however, that these are normally picked out by the epithelial cells of the intestinal mucosa and rebuilt up into body proteins, never reaching the blood in their original form. So long, therefore, as the intestinal epithelium is intact, these bodies cannot be the cause of a 'toxæmia.'

2. *The ecto- and endo- toxins of bacteria* are poisons which are either secreted by bacteria resident in the intestine or contained inside the bacteria and liberated on their disintegration. It is pretty generally admitted by bacteriologists that this cannot be an important source of auto-intoxication in the body, for in the first place the typical

bacterial denizens of the intestine, e.g., *B. coli*, do not produce ecto-toxins, whilst on the other hand, examination of the fæces shows that the bacteria excreted from the body, though present in enormous numbers, are dead but not disintegrated, so that any endotoxins they contain are not liberated.

3. *The best known of the poisons produced by the action of bacteria on the ultimate products of protein digestion* are aromatic substances of the indol group, e.g., indol, skatol, phenol, and cresol, which are derived from the bacterial putrefaction of proteins. The manufacture of these bodies in the intestine and their excretion by the urine has long been known, and it has been usual to ascribe to them a large share in the production of so-called alimentary toxæmia. Experiment has certainly shown that such substances are toxic, and Vaughan Harley[2] considers them capable of producing symptoms which may be roughly described as resembling those of neurasthenia. On the other hand, there is an increasing belief that an exaggerated importance has hitherto been attached to the indol substances, and that amino-bases produced by the splitting off of CO_2 from proteolytic amino-acids are more probable sources of poisoning (Mellanby). About these, however, and their effects, we really know very little definite as yet.

It will be observed that the chemical basis of the doctrine of alimentary auto-intoxication is exceedingly slender; and even as regards its bacteriology, Ledingham,[3] after a review of the whole subject, is constrained to admit that the results of bacteriological investigation already published do not lend much support to the thesis. It has further to be considered that the production of poisons in the intestine has always been going on, and that a protective mechanism in the wall of the bowel and in the liver has been evolved to deal with such poisons as are absorbed, and to prevent their reaching the general circulation. Unless, therefore, this mechanism has broken down, it is difficult to see how any great amount of 'auto-intoxication' can take place.

The difficulties in the way of accepting any purely chemical theory of the production of the symptoms alleged to be due to toxæmia are so great that Adami[4] has elaborated as a substitute for it the theory that slight or 'sub-infections' of the tissues by bacteria derived from the bowel are comparatively common, and that, with inflammatory conditions in the alimentary canal and greater accumulation of leucocytes in its walls, there must be greater passage of these from the surface and more extensive carriage of bacteria into the system. According to the virulence and number of these bacteria, so may there be set up other foci of active infection—a condition which he terms 'sub-infection.' That is to say, the bacteria thus carried in do not multiply and set up foci of suppuration; they are destroyed, but with their destruction the liberation of their toxins causes a poisoning of the cells immediately around them, and the accumulative action of these toxins, whether locally or at a distance, upon the liver cells,

for example, brings about the death of certain cells and their replacement by fibrous tissue.

Whether the symptoms of so-called alimentary toxæmia are the result of the absorption of chemical poisons, or whether they are due to sub-infections as suggested by Adami, is, perhaps, a matter of secondary importance, seeing that either result might be brought about by a 'stasis' of the intestinal contents.

Before proceeding to consider the evidence for intestinal stasis, it may be well to enumerate the symptoms which the chief exponents of the theory attribute to 'auto-intoxication.' They are :—

1. Loss of fat.
2. Wasting of both voluntary and involuntary muscles.
3. Alteration in the texture and colour of the skin, with pigmentation and offensive perspiration.
4. Subnormal temperature, especially affecting the extremities. There is no abrupt line of separation between this condition and Raynaud's disease, of which it would appear to be a stage.
5. Mental conditions of apathy, stupidity, or misery, which may become exaggerated to a state of melancholia, or even apparent imbecility, with suicidal tendencies. There may be neuralgic symptoms, neuritis, frequent headache, loss of control over the temper. These nervous states due to stasis are a much more frequent cause of serious crime than is generally imagined.
6. Rheumatic aches and pains in muscles, joints, and skin.
7. Atrophy of the thyroid gland.
8. Either increased or lowered blood-pressure.
9. Degenerative changes in the breasts, especially in the upper and outer zone of the left breast, predisposing to cancer.
10. Prolapse of abdominal organs, partly because of loss of fat, partly because of wasted muscle fibres. Increased mobility of the kidneys, and prolapse and bends of the uterus.
11. Breathlessness on exertion, at times of asthmatic type, due in some cases to a distention of the stomach and intestines.
12. Degeneration of the heart muscle, with dilatation of left heart and aorta and arteriosclerotic changes (atheromatous) in the systemic arteries.
13. Renal changes which are roughly grouped under the term "Bright's disease."
14. Early loss of hair colour, with falling out, more common in those with dark than with red hair.
15. Affections of the pancreas with chronic induration, inflammation, and finally cancer. Pancreatic diabetes.
16. Infection of the biliary system, cholecystitis, cholelithiasis, cancer, together with many acute and chronic diseases of the liver.
17. Degenerative diseases of the eye.

The indirect changes resulting from the lowered resisting power of the tissues can, says Lane, hardly be separated abruptly from these more direct changes. Of these the most obvious are :—

1. Infection of the gums and pyorrhœa alveolaris.

2. Tuberculous infection other than that due to direct inoculation, as through the skin.

3. Rheumatoid arthritis. This, like tuberculosis, is declared not to develop, except in the presence of defective drainage of the gastro-intestinal tract.

4. Infection of the genito-urinary tract, producing nephritis, cystitis, pyelitis, endometritis, salpingitis, etc.

5. Thyroid disorders, such as diffuse enlargement, exophthalmic goitre, adenomatous tumours.

6. Still's disease.

7. Pustular infections of the skin.

8. Infections of the large intestine ; several varieties of mucous and ulcerative colitis.

9. Ulcerative endocarditis.

These, Lane considers, are merely a few obvious, typical, indirect results of the 'auto-intoxications' of chronic intestinal stasis.

CHRONIC INTESTINAL STASIS.

Chronic intestinal stasis means, according to Lane's definition,[5] "that the passage of the contents of the intestinal canal is delayed sufficiently long to result in the production, in the small intestine especially, of an excess of toxic material, and in the absorption into the circulation of a greater quantity of poisonous products than the organs which convert and excrete them are able to deal with."

The cause of the delayed passage, in his view, is partly ptosis of the intestines, and partly the production of 'kinks' at various points, owing to the development of bands stretching from the intestine to the abdominal wall, which pull upon the gut and produce the kinks. As the bands referred to are believed by many supporters of the theory of stasis to play a leading part in its production, they require some further consideration.

Of the existence of the bands there can be no doubt, and they are met with at various points in the course of the alimentary canal. Pringle[6] describes six of them :—

1. The gall-bladder-duodenum band, from the under surface of the gall-bladder to the first part of the duodenum.

2. The mesocolic band, which suspends the antimesenteric border of the first few inches of the jejunum from the under surface of the transverse mesocolon.

3. Lane's ileal kink, which extends from the brim of the pelvis to the ileum a few inches from its junction with the colon.

4. Jackson's membrane, a thin vascular veil extending over the cæcum and ascending colon.

5. The splenic kink—an exaggeration of the phrenicocolic ligament.

6. The pelvic colon kink—Lane's 'last kink'—due to a band fixing the large bowel on the left side to the pelvic brim.

Whilst there is general agreement as to the existence of these bands,

there is some difference of opinion as to their mode of formation. Three views have been expressed on this point:—

1. That the bands are congenital or developmental, due to abnormalities in the fusion of the peritoneum in the course of development.

2. That they are evolutionary, being evolved to meet strain. This is Lane's view. He considers that "owing to unsuitable diet in infancy and to the habitual assumption of the erect position, delay of fæcal material takes place in the large bowel, or cesspool, of the gastro-intestinal tract, or, as it can be best described, the 'general drainage system of the body.' In consequence of this, new membranes or resistances to downward displacement are formed by the crystallization of lines of force upon the surface of the peritoneum along which strain is specially exerted."

3. That they are inflammatory, the result of repeated mild infections from the wall of the bowel. This theory has been put forward by Pilcher.[7]

Of these views, the first is that which at present seems to command most support, in favour of it being the fact that the bands in question can be recognized in many cases in the fœtus.

From a practical point of view the exact mode of origin of the bands is perhaps of secondary interest, provided they are really capable of causing kinking and obstruction. Most surgical writers seem to agree that they are so capable, although others admit that it is difficult to see how kinking of the ileum can cause any real obstruction, seeing that its contents are fluid. Hertz[8] also points out that the ileocæcal valve normally acts as a sphincter to prevent the too rapid passage of the ileal contents into the colon, and that it produces more delay than Lane's kink is likely to do. Others, again, consider that the bands are not capable of causing obstruction unless in association with marked visceral ptosis, or unless the tone of the intestinal wall be defective.

In face of these conflicting opinions it is very difficult to arrive at any estimate of the real importance of bands and kinks in the production of stasis; but it is noteworthy that such a competent observer as W. Mayo,[9] although paying a high tribute to the value of Lane's work, does not agree with him 'in the great stress which he lays on the rôle of bands, kinks, etc.'

Diagnosis.—The existence of stasis is inferred when the symptoms of 'auto-intoxication' already mentioned are present. Whilst it may readily be admitted that many of the symptoms above enumerated can be removed by an improved 'drainage' of the alimentary system, it must also be allowed that the connection between some of them and intestinal stasis is, to say the least, problematical. Tuberculosis is a case in point. As Adami reminds us, the cow is an animal peculiarly subject to tuberculosis, yet no one would say it suffered from intestinal stasis! Duodenal ulcer is also ascribed to stasis by the more enthusiastic advocates of that theory, yet duodenal ulcer is many times more frequent in men than in women, while it is generally

admitted that stasis is much more common in the female sex. Similar criticism might be applied to many of the other diseases set out in Lane's list, but these examples must suffice.

Turning to the *objective evidence of stasis*, it consists mainly in the result of *x*-ray examination after a bismuth or barium meal. Statements differ as to what constitutes a delay sufficient to justify a diagnosis of stasis, but the presence of bismuth in the lower end of the ileum from six to nine hours after the ingestion of the meal is usually considered indicative of it. In connection with this matter there is perhaps too great a tendency to draw far-reaching conclusions from a single examination, on the assumption that the passage of the contents of the small intestine goes on at a uniform rate from day to day. Whether such an assumption is justified is doubtful. Delay in the colon is considered to be indicated by retention of bismuth in the large bowel forty-eight hours after its ingestion.

The *presence of* '*kinks*' *and bands* is indicated symptomatically by pain or chronic discomfort, most commonly in the right iliac fossa. Objectively, the existence of kinks can only be determined by the *x* rays. Here, however, great caution in arriving at a positive conclusion is required, for, as Hertz points out, the shadow on the screen is in one plane only, and as the end of the ileum tends to bend in various directions, many kinks are only apparent and not real. This can be proved by palpating the abdomen during the examination.

To sum up, it may be said that there is a considerable amount of evidence to show that a delay in the passage of the contents of the alimentary canal is capable of producing widespread pathological effects, although the extent and seriousness of these has been greatly exaggerated by some writers. To what extent these effects are due to the absorption of chemical poisons of unknown nature, and to what extent to 'sub-infections' or to a failure on the part of the intestinal epithelium or of the liver to exercise the proper neutralizing influence on poisons, is unknown. The part played by mechanical factors such as ptosis, bands, and kinks in promoting the 'stasis' is also still under discussion, and can only be determined by a careful study of the effects of operations.

Treatment.—'Intestinal stasis' is, after all, only another name for constipation, and it should be possible to prevent its occurrence in most cases by timely and judicious medical treatment. This will embrace the adoption of a suitable **Diet**, the use of abdominal **Exercises** and **Massage** to develop the muscles of the abdominal wall, and, in cases in which ptosis is marked, the wearing of an **Abdominal Support. Electrical** treatment by the sinusoidal current is highly spoken of by Hernaman-Johnson.[10] He says that it will cure 50 per cent of obstinate cases and nearly all the mild ones, and that the effects are lasting. In most cases it is almost impossible to dispense with the use of laxatives, although the routine administration of these should be restricted as far as possible. **Liquid Paraffin** is at present the most popular remedy,

but many of the older laxatives are really quite as good, provided the less irritating ones be selected.

Surgical Treatment, it is generally agreed, should be reserved for the more severe and obstinate cases—especially those in which obstructive symptoms are present. There is a wide choice of procedures, and surgeons are as yet by no means agreed as to those which are the most suitable. Stanley Barling's[11] advice to make a long incision, so that one can see exactly the conditions to be dealt with, seems sound. It is pointed out by many surgeons that mere division of bands and membranes is apt to be unsatisfactory unless care be taken to cover over with peritoneum the raw surface left after division of the band; otherwise fresh adhesions are apt to form. Appendicectomy seems to give relief in some cases, perhaps because it has been causing a spasm of the ileocæcal valve (Hertz, Paterson). Most surgeons are chary of the suturing into position of dropped viscera, although others do not hesitate to carry this out in suitable cases. On the whole, however, surgical opinion is not in its favour.

Of the more ambitious operations there are now to be considered **Ileosigmoidostomy** (short-circuiting) and colectomy, partial or complete. The former has few supporters, with the exception of Lane and his followers. Gray[12] speaks of the operation 'only to condemn it,' whilst on the other hand Paterson[13] considers it a 'safe, and in the majority of cases a satisfactory operation.' The chief objection to it is that there is very apt to be reflux into the colon afterwards, which may give rise to all the old troubles. The writer has seen this happen in several cases, although some years may elapse before the symptoms declare themselves. Troublesome diarrhœa is also an occasional sequel of the operation.

Complete **Colectomy** is only suitable in the severest cases and if the whole colon be 'dropped' and freely movable. Some surgeons, following W. Mayo,[14] now adopt a partial colectomy, which consists in dividing the ileum and anastomosing it to the transverse colon in an antiperistaltic direction, and then resecting the terminal portion of the ileum, the cæcum, and the right half of the transverse colon.

The relative value of the different proceedings is a matter which cannot be decided without further experience, and it is particularly necessary to have reports of the results of the operation some years after it has been performed. It cannot be said that much evidence of this sort has yet been accumulated. As regards the *immediate mortality of operation*, Lane's results as collected by Bainbridge[15] are surprisingly good. He gives statistics of 54 cases of short-circuit and 52 of removal of colon—106 in all, with only 4 deaths; 2 from sepsis, 1 on the table, and 1 from pulmonary embolism. His assertion that 'thus the exaggerated statements of great mortality are not borne out' certainly seems fully justified. What one wants to know, however, is the condition of the patients some years after the operation, and no doubt with time a sufficient amount of statistical

material will be collected to justify or condemn these operations. Meanwhile it is wise to suspend judgment. "The truth is great and will prevail."

REFERENCES.—[1]*Proc. Roy. Soc. Med.* vi, No. 5 (Supplement), 1913, 17 ; [2]*Ibid.* 28 ; [3]*Ibid.* vi, No. 7 (Supplement), 1913, 139 ; [4]*Brit. Med. Jour.* 1914, i, 177 ; [5]*Ibid.* 1913, ii, 1125 ; [6]*Ibid.* 1914, i, 183 ; [7]*Ann. Surg.* 1914, i, 1 ; [8]*Proc. Roy. Soc. Med.* vi, No. 7 (Supplement), 1913, 163 ; [9]*Jour. Amer. Med. Assoc.* 1914, ii, 446 ; [10]*Brit. Med. Jour.* 1914, i, 531 ; [11]*Med. Press and Circ.* 1914, i, 380 ; [12]*Brit. Med. Jour.* 1914, i, 188 ; [13]*Ibid.* 1913, ii, 1088 ; [14]*loc. cit.* ; [15]*Ibid.* 1129.

ALOPECIA AREATA. *E. Graham Little, M.D., F.R.C.P.*

Guthrie,[1] working in Brocq's clinic at St. Louis Hospital, contributes a useful paper on various types of baldness, of which he makes three classes.

1. *Alopecia Simplex*, or *Pityriasis Simplex*, as it is more usually called, resulting from the occupation of the scalp by a microbic infection, including in earlier stages the bottle bacillus or spore of Malassez, and later the polymorph coccus of Cedercreutz. The great majority of cases of dandruff are of this nature, and, if untreated, alopecia is the sequel, taking the form of temporal and vertical baldness in men, and in women a thinning of the hair without actual baldness. This curious difference in result as it affects sex, suggests the possibility of some added influence from an internal secretion from sex glands, and some confirmation of this suggestion is derived from the old observation, lately corroborated by an investigation of Sabouraud, that eunuchs do not become bald.

This type of alopecia should be energetically treated as soon as the diagnosis is made. The following measures are recommended :—

The scalp in male patients should be washed daily, in females every week or fortnight, with a lotion such as this :—

℞	Tinct. Lavand. Co.	ʒiij	Sap. Mollis Spt. Vini Methyl.	āā ʒiij

The scalp is first wetted with lukewarm water, then rubbed with a handful of the soap spirit so as to produce a good lather. Finally, the head should be washed in several changes of water and thoroughly dried. This treatment alone will go far towards freeing the scalp from scales and arresting further loss of hair. Should such frequent employment of soap cause the hair to become too dry, the occasional use of the yolk of an egg beaten up in a glass of water may be mentioned as an excellent cleanser for the healthy scalp. In addition to this treatment, it is often advisable to prescribe a lotion or pomade.

The following is recommended by Sabouraud :—

℞	Hydrarg. Perchlor. Acid. Salicyl.	gr. x gr. xl	Spt. Vini Rect.	℥iv

Brocq prefers a sulphur lotion :—

℞	Sulph. Præcip Spt. Camph.	ʒiv ʒvi	Glycerini Aq. Dest.	ʒij ℥iv

A third, very excellent lotion, owing its action to resorcin, may be quoted :—

℞	Resorcini	ʒij	Glycerini	ʒiv
	Spt. Vini Rect.	ʒiij	Aq. Rosæ	℥iv

Euresol is by many preferred to resorcin, as it does not tend to darken fair hair. In severe cases, and particularly in male patients, better results may be secured by the use of pomades. Two well-known examples, are :—

℞	Sulph. Præcip.	gr. xxx	Ol. Ricini	ʒv
	Ol. Theobromat.	ʒj	Tinct. Benzoin.	♏v
℞	Resorcini		Ol. Cadini	
	Acid Salicyl.	āā gr. x	Lanolini	
			Vaselini	āā ʒij

2. *Alopecia Areata.*—This variety is distinguished by the suddenness of the onset, the complete and glistening smoothness of the surface, which may be slightly œdematous, and the presence of characteristic hairs like the upper stroke of the note of exclamation, and called by this name. The causation remains entirely obscure, and recurrence after apparent cure is met with in at least 70 per cent. of cases. Similar patches may occur in the beard region, and much more rarely there may be complete loss of hair all over the body. Certain collateral symptoms have been noted with some frequency, such as hyperidrosis of the hands, laxity of the skin of the face, fibrillary twitching of the facial muscles, leuconychia and pitting of the nails. It is essentially a disease of youth, being rarely seen after the age of thirty. A common factor in all methods of treatment is the attempt to maintain the bald areas in a state of constant slight irritation. The following prescriptions are of time-honoured efficiency :—

℞	Acid. Acetic.	gr. xv	Æther.	ad ℥j
	Chloral. Hyd.	gr. lxxx		

Or,

℞	Acid. Lactic.	ʒj	Spt. Vini Rect.	
			Æther.	āā ℥ss

An excellent preparation, which certainly has stood the test of time, is the ' lotio excitante ' of St. Louis Hospital :—

℞	Liq. Ammon. Fort.	ʒij	Spt. Camph.	℥iv
	Ol. Terebinth.	ʒv		

Whichever remedy is selected, the mode of use is the same : one application with friction daily, or on alternate days should too much irritation be caused. Some authorities recommend the use of minimal doses of *x* rays ; others have obtained good results from high-frequency currents.

3. *Infective or Toxic Alopecia.*—This group includes the large class of cases occurring after acute infections, of which erysipelas is one of the most frequent. The alopecia of secondary syphilis usually takes the form of thinning of the hair ; but there is a rarer type of areate patches. " Toxic alopecias are generally of good prognosis."

Freshwater[2] explains the greater immunity from senile alopecia of women, as due to the greater care bestowed on the hair, and also because the female scalp is thicker, and contains more fat. He thinks that the gradual development of senile alopecia may be retarded by **Massage** and the employment of **Antiseptic Lotions.** He describes two stages of the affection. A diminution in the length of life of the hair and a shortening of individual hairs marks the first stage, which is followed by a gradual failure of reproduction of hair and a general thinning. If seen in the first stage much may be done. Recognition of this condition may be made by noting the proportion of long hair to short in the falling of three consecutive days. If, in women, hairs shorter than six inches form one-third of the total number, an abnormal condition may be diagnosed. In the case of individuals with short hair, which has been cut, there will be a certain proportion of pointed, i.e., diseased, hairs, and this proportion should not be more than one-quarter of the whole quantity shed. Senile alopecia normally comes on about the age of forty-five. Premature cases may occur as early as twenty.

Alopecia may also result from seborrhœa capitis, a condition very much commoner in the male than in the female, and caused by the *Bacillus seborrheæ* of Sabouraud, an anaerobic organism which is probably identical with the bacillus of acne, although this identification is disputed. The clinical manifestations of seborrhœa capitis are an oily but not necessarily scaly condition of the scalp, with dilatation of the hair follicles, from which a small white mass known as the seborrhœic filament can be squeezed by pressure.

Certain drugs are credited with a general effect in promoting the growth of hair. The most important of these are **Thyroid Extract,** especially in ichthyotic and mildly myxœdematous cases ; and **Pilocarpine,** which is best administered in the form of injections or local applications. Two formulæ are given :—

℞ Pilocarpin. Hydrochlor. gr. vij Resorcini gr. xij	Ol. Lavand. ℥iij Spt. Vini Rect. ad ℥j

℞ Pilocarpin. Hydrochlor. gr. v Resorcini gr. x Ol. Ricini ℥xx	Ol. Lavand. ℥x Spt. Vini Rect. ad ℥j

The latter is to be preferred when the effect of the first is too drying. The use of pilocarpine should be combined with **Massage** of the scalp, which should be performed by pinching up the tissue of the scalp between the fingers, and not by mere friction of the surface with the finger-tips as usually practised. Twenty minutes a day should be the minimum time devoted to this treatment. **Iron** may be advantageous where there is any tendency to anæmia, and **Arsenic** in some cases.

Walsh[3] propounds the statement that "abnormal loss of hair, whether acute or chronic, diffuse or patchy, is in the majority of cases associated with some serious cardiovascular defect which constitutes an essential predisposing cause," a view which has received practically no support.

What may be referred to as the contagious theory of alopecia areata is losing adherents very completely, and there was apparent a large majority against the view in the discussions of this subject at the recent International Congress. Special interest therefore attaches to a report by Davis[4] of an experience of his own, which pointed strongly to an epidemic of the disease occurring in an orphan asylum in which 174 inmates out of some 300 were affected. No infective cause could be demonstrated. The treatment adopted was to isolate the more severe cases, wash the scalps in all cases with Hebra's **Linimentum Saponis,** and thereafter rub in ointments of β-**Naphthol** and **Sulphur,** with massage of the scalp. The epidemic ceased with these measures, to break out again nine months later in the same institution, when 42 new cases were demonstrated. This second epidemic yielded within six weeks to the measures detailed above, with the addition of the use of **Liniment of Iodine** (practically *tinct. iodi fort.* B.P., 1914).

References.—[1]*Pract.* 1913, ii, 552 ; [2]*Ibid.* 532 ; [3]*Brit. Med. Jour.* 1913, ii, 1007 ; [4]*Brit. Jour. Derm.* 1914, 207.

AMŒBIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

Etiology.—E. L. Walker, with the co-operation of A. W. Sellards,[1] has carried out a most important experimental investigation into entamœbic dysentery, which places the etiology of that widespread and serious disease on a much firmer basis. Volunteers from among the Filipino inhabitants of the Bilibid Prison at Manila were fed on various species of amœba, which were carefully studied and defined. The stools were examined daily until infection was established, or had been proved to have failed, and all amœbæ detected were minutely studied to ascertain their exact species. The experiments were carried on for eighteen months, and when infection occurred, prompt treatment was adopted, and all were cured before any serious symptoms had developed, while information of the greatest practical importance was obtained. The experiments fall into three classes :

1. *Feeding experiments with cultures of saprophytic amœbæ* (not entamœbæ), such as occur in water, on vegetables, and in the air, and which have been considered by Musgrave, Clegg, and others to be pathogenic for man. This class of organism belong to the genus amœba, Ehrenburg, and are characterized by the greater part of the chromatin of the nucleus being arranged in a central karyosome, the presence of a contractile vacuole, and the formation of mononuclear cysts, and their ability to multiply on artificial media. Twenty feeding experiments with cultures, mainly in the resisting encysted form, from eleven sources, were made on ten different men, but no trace of dysentery was ever produced. The amœbæ could never be found microscopically ; but in all but two strains they were recovered from the stools in cultures between the first and sixth days after feeding, but not later ; and all retained their original characters, having passed unchanged through the intestinal tract. It is therefore clear that cultivable amœbæ are not capable of living as parasites in the human intestine.

2. *Feeding experiments with Entamœba coli*, which are commonly found living parasitically in the intestines of healthy people. They have no contractile vesicle, the nucleus is excentrically placed, the chromatin is at the periphery of the nucleus and fairly abundant, while in the encysted stage from four to eight nuclei are present; they cannot be cultivated on artificial media. Twenty men, whose intestines had been shown by repeated examinations to be free from amœbæ, were made to ingest *E. coli*, for the most part in the encysted stage; the stools were examined daily and cultures made from them, the latter method invariably giving negative results, although in seventeen of the men *E. coli* were found microscopically in the stools after one to eleven days, the average incubation period having been 4·7 days, while they have persisted in the stools for an indefinite time. No dysenteric symptoms have ever resulted from the parasitization of these seventeen men with the *E. coli*, so it is clearly a non-pathogenic obligatory parasite, which plays no part in the etiology of amœbic dysentery.

3. *Feeding experiments with the E. histolytica* (Schaudin), including the *E. tetragena*, which has been demonstrated by Walker to be the same species. This entamœba has a distinct refractile ectoplasm and a granular vacuolated endoplasm. The nucleus has an excentric nucleus with only a thin rim of chromatin, and is scarcely visible in fresh specimens. According to Schaudin it multiplies by throwing off buds containing chromatin; but it is now known to form cysts with only four nuclei, on account of which Viereck called it *E. tetragena*. The present experiments confirmed the identity of these two forms, for men fed on *E. histolytica* developed 'tetragena'-encysted forms, and vice versa; but the former name is the correct one, as it was the earlier one given by its discoverer Schaudin. Twenty men have ingested material containing different stages of this entamœba after their stools had repeatedly been found to be free from amœbæ by cultures and microscopical examinations, and the examinations were repeated daily. When any symptoms of dysentery arose, ipecacuanha treatment was promptly given. In no case were any amœbæ recovered by culture. Of the twenty men, seventeen became parasitized after the first feeding, and one more after three feedings. Encysted *E. histolytica* infected in 85·5 per cent, and motile ones in 75 per cent, the capsules in which they were administered in the latter case always containing magnesium oxide to neutralize the acidity of the stomach. The incubation period varied from 1 to 44 days, and averaged 5·7 days, excluding one case with an abnormally long incubation period. Of the eighteen men parasitized with *E. histolytica*, four developed entamœbic dysentery, two being mild and two severe, lasting one or two weeks. The incubation period of the attacks varied from 25 to 95 days, averaging 64·8 days. One parasitized patient died of tuberculosis 165 days later, and showed no amœbic lesions post mortem. No case of spontaneous dysentery occurred in the ward during the experiments. Walker justly con-

cludes that *E. histolytica* is a strict and obligatory parasite, which cannot be cultivated on artificial media, and that it is the essential etiological factor in endemic dysentery.

E. R. Whitmore[2] agrees with Walker's view that there is only a non-pathogenic *E. coli*, and one pathogenic species corresponding with *E. tetragena*. C. F. Craig[3] deals further with the classification of amœbæ, and also subscribes to the above conclusion, but thinks the pathogenic variety should be known as *E. histolytica*, as it was first fully described by Schaudin under that name : a suggestion which is receiving general acceptance. W. M. James[4] publishes an elaborate and beautifully illustrated paper on the entamœbæ of man met with at Panama, in relationship to the clinical types of the disease. After summarizing the previous literature, he describes in detail the histolytica and tetragena types of entamœbæ, but agrees with other recent workers in considering them variations of the same species. He considers the budding forms, described by Schaudin as the normal reproduction of the species, to be really degenerative forms, as he only found them in specimens which had been kept for two or more hours without fixing, during which rapid degeneration takes place. He finds the large vegetative histolytica type to be especially associated with acute cases of amœbic dysentery, while in milder and improving cases, and chronic or latent ones, the organisms tend to pass into the tetragena-encysted forms, which then preponderate. In an intermediate group the minute type, described as a different species by Elmassian, is found, and he considers it to be the early stage of encystment of *E. histolytica*. A good account of staining processes is also given.

The foregoing papers go a long way towards clearing up the vexed question of the number of species of entamœbæ in the human bowel, and much simplify the former classifications.

H. Z. Giffin,[5] working at the Mayo clinic in Minnesota, examined the stools of 1700 patients, and found amœbæ in 13 per cent. In 227 they were *E. coli*, and in 79 *E. histolytica* and *tetragena*, about half of the latter patients having been infected in the neighbouring states. The chief symptoms were diarrhœa, abdominal pain, and indefinite gastric symptoms. In the patients showing *E. coli*, diarrhœa had also frequently been present. **Ipecacuanha** and **Kerosene Oil** enemata were used in the treatment with good results.

L. Landouzy and R. Debré[6] deal with *carriers* of amœbic dysentery, and conclude that colonial surgeons should carefully watch convalescent patients to ensure the complete disappearance of the organism from the bowel, and thus prevent their becoming carriers, and that entamœbæ should also be sought for in cases of enlargement of the liver. W. L. Christie[7] writes on latent dysentery or dysentery carriers in Borneo, where he found that 12 per cent of 554 patients admitted for all kinds of diseases were harbouring entamœbæ, while 3·4 per cent were actual cases of dysentery. Many patients showing debility, anæmia, wasting, and even fever, without actual symptoms

of dysentery, were amœba carriers, and improved greatly on **Emetine** treatment. In 100 consecutive admissions, as many as 34 per cent were amœba carriers. Lim Boon Keng[8] found infection with amœbæ very common in Singapore in cases with most varying symptoms. The organism was similar to the *E. histolytica*. In addition to fever liable to be mistaken for malaria, as pointed out by Rogers, he thinks the organism may produce debility, chronic bronchitis, skin eruptions, etc. The emetine treatment was effectual. In a further note[9] he attributes a variety of other symptoms, such as rheumatic pains, asthma, etc., to the same organism, and describes in an indefinite manner a very pleomorphic protozoal organism, including a "fungus-like thallus, with cellulose walls with central venation, which send off branches," which he thinks produces all kinds of infections from endometritis to boils, and is in some indefinite way related to amœbæ.

O. Thurston[10] tabulates 101 cases of *liver abscess* treated in thirteen years in Bengal, only one being pylephlebitic in origin. Only 3 were in females, while the average age was 34·5 years. Out of 79 cases noted, 44 only gave a history of dysentery. Alcohol was an important factor in predisposing to the disease. The duration of symptoms before operation averaged over fifty days. The total mortality was only 33 per cent. The earlier cases were treated by incision and drainage, a method he considers as obsolete except in certain unusual conditions. **Aspiration** and **Medicinal Treatment**, as advocated by Rogers, gives the best results. In cases without medicinal treatment the mortality was 40 per cent, under ipecacuanha 28·6 per cent, and with emetine injections 25 per cent. The average amount of pus aspirated per case was 62 oz., the puncture having to be repeated in many cases. The cases in which quinine solution was injected into the abscess cavity after aspiration showed material advantage over others without the quinine injections. His present practice is to inject a grain of **Emetine** hypodermically immediately after aspirating, so as to flush the wall of the abscess cavity through the serum exuded after the operation, and thus kill the amœbæ. He aspirates in all cases except when the abscess is almost pointing. [Even such cases may be successfully aspirated a little to one side of the 'pointing' area.—L. R.] Occasionally even repeated aspiration may fail, and incision be necessary. In such cases a long rubber tube is inserted through a small incision, and closely stitched to the skin incision, and siphon drainage into a bottle filled with lotion under the bed is established, which very much reduces the risk of secondary septic infection.

E. A. R. Newman[11] prefers the **Open Operation** for liver abscess as the result of an experience of twenty-nine cases. He thinks the aspirator a dangerous instrument, and mentions several cases of fatal hæmorrhage after its use as an exploratory measure, while it is often unreliable. Aspiration should never be performed through the abdominal wall unless it is certain that adhesions exist. He is also opposed to aspiration and quinine injections. Thanks to emetine, the number

of cases of liver abscess in Europeans has been much reduced. After hearing Rogers's views and Thurston's paper, Newman thought that a new era of usefulness for the aspirator may result from its combination with emetine injections. In operating, he prefers to cut down without a preliminary aspiration, and drains through two tubes into dressings. He reports one case of fatal secondary septic infection.

J. D. Sandes[12] records 32 cases of liver abscess, many of them moribund on admission, in which **Aspiration alone** was possible, with six deaths in 21 aspirated cases, including one with 126 oz. of pus removed at the first aspiration. In several small epigastric abscesses, which do well with any treatment, incision was successful. In medium-sized abscesses of from 20 to 30 oz., aspiration and injection of **Quinine** does well. He found C. R. Stevens's plan of removing the residual thick pus by forcible aspiration by means of a strong metal syringe to be of value. Chloroform should be avoided in bad cases, and ethyl chloride used as a local anæsthetic. He concludes that aspiration is the measure of choice, preferably high up in the posterior axillary line ; incision should be reserved for small pointing left-lobe abscesses and cases in which repeated aspiration has failed to cure, such doing better by the combined plan than by primary incision.

K. K. Chaterji[13] has used Rogers's method of repeated aspiration and hypodermic injections of emetine with very favourable results. The mortality in 33 aspiration cases was only 6·6 per cent, while in 15 incised cases it was 60 per cent. The average stay in hospital after the open operation was 35 days, and after aspiration 14 days, while secondary infection, which is practically unavoidable after the open operation, is prevented, and shock is almost nil, although severe after incision. He also records two spleen abscesses successfully treated by aspiration and emetine injections. **Emetine** is also of great value in the pre-suppurative stages of hepatitis in preventing abscess formation, and in pericolitis following amœbic dysentery. A. H. Nott[14] also supports strongly the plan of aspirating liver abscesses and giving emetine, and records a remarkable case in which the drug greatly modified a very acute case of multiple suppurative hepatitis. He finds the aspiration and emetine treatment to be a much less fatal procedure than excision of a rib and drainage. He also aspirates small epigastric abscesses, if the skin is not involved.

L. Rogers[15] records that in the six years following the publication of his paper on ipecacuanha as a preventive of amœbic liver abscess, as compared with the previous six years, at the Calcutta European General Hospital, the admissions for liver abscess have been reduced by 58 per cent, and the deaths by 68·6 per cent, while in the British Army in India the annual deaths from liver abscess have been reduced by nearly two-thirds. With the emetine treatment still greater saving of life should be obtained. In concluding the Calcutta debate on the foregoing papers, Rogers pointed out that the power of **Ipecacuanha** and **Emetine** to destroy pathogenic entamœbæ in the body tissues places the aspiration treatment of liver abscess on quite a different

basis from that which it formerly occupied, and makes it no longer necessary to incise amœbic liver abscesses except in a few special cases.

F. W. Dudley[16] confirms the effect of emetine in preventing amœbic liver abscess, while one case in which a little pus was found with the aspirator, cleared up under the drug without operation. Liver abscess, formerly one of the most frequent major operations, now takes rank as a rarity in Manila. In large single liver abscess he has recently been resorting to Rogers's method of sterile siphon drainage with quinine irrigation with considerable success, and he found Rogers's flexible sheathed trocar of distinct advantage, though a long trocar and rubber catheter can be used.

J. Cantlie[17] deals with liver abscesses opening through the lungs. Once pus has formed, and especially if it has escaped beyond the liver, surgical interference becomes necessary. When it opens into the lung, operation may be necessary to prevent exhaustion, or if a sinus track remains which will not heal. He describes and illustrates the course the pus usually takes to reach a bronchus. Relapses usually occur with pain and fever, during which it may be possible to open the abscess. When the pus passes between the lung and the pericardium, operation is difficult ; but in two cases he reached it by resecting 2 in. of the sixth and seventh ribs in the axillary line, and pushing a needle through the lung. A. J. Noronha[18] records a case of bloody expectoration for three years, thought to be phthisis, in which he found amœbæ in the sputum, and rapidly cured the liver abscess tracking through the lung by **Emetine** injections without operation. J. Bell[19] records one case of amœbic hepatitis and two of liver abscess similarly cured. R L. Spittel[20] opened a large liver abscess, and gave emetine. Owing to the tube slipping, fatal peritonitis ensued. Post mortem, the 30-oz. cavity had contracted to 4 oz. J. E. Thompson[21] also deals with the pulmonary complications from the surgical point of view, and discusses the anatomical considerations of operative measures, with illustrations. He also emphasizes the difficulty in finding the secondary abscess in the lung as long as it is discharging freely through a bronchus ; but if the discharge stops and fever occurs, the cavity may sometimes be found. He considers the mortality of these cases to be as high as 75 per cent. He does not refer to the rapid healing of such abscesses under emetine recorded by Professor Chauffard and others, which has recently so greatly improved the prognosis in this class of case.

E. B. Vedder[22] publishes an interesting review of the present position of the **Emetine** treatment. After referring to his own experiments, demonstrating the activity of emetine salts against cultivated amœbæ, he gives Rogers credit for introducing the new treatment practically, and goes on to analyze 110 cases of amœbic dysentery so treated by different workers, concluding that any patient who is not moribund can be cured. In hepatitis also, 100 per cent were cured, against a former mortality of 30 to 80 per cent, which he regards as a therapeutic

triumph. It is too early to say if the emetine cures of amœbic dysentery are permanent, but there is some probability of their being so. With moderate, but effective doses, there is no danger, but as animals can be killed rapidly with intravenous doses, he urges caution in pushing the drug by that route. As it is irritating, he prefers to give $\frac{1}{3}$-gr. doses three times a day hypodermically. When the amœbæ have been killed in the tissues, he thinks **Quinine** and **Silver Nitrate Irrigations** may be useful in destroying the organisms in the bowel contents to eliminate carriers. F. C. Yeomans[23] found emetine a reliable specific in amœbic dysentery in New York, where the cases are not very severe. R. G. Archibald[24] finds that young children stand the drug very well, so that in a child of two, $\frac{1}{6}$ gr. may be given every twelve hours for three doses. G. W. McCaskey[25] records a case of thirteen years' duration rapidly cured with emetine and accompanied by the disappearance of both leucocytosis and eosinophilia. Martin Mayer[26] treated a case of severe dysentery with large numbers of *Lamblia intestinalis* and *spirochætæ* in the stools, which was rapidly cured by emetine injections.

In a discussion on the emetine treatment at Calcutta,[27] L. Rogers describes experiments on the action of emetine and cephaeline hydrochloride, and mixtures of the two in the proportions present in ipecacuanha, on paramœcia. The cephaeline salts were much less effective than the emetine ones, and the mixtures were intermediate in their power, emetine hydrochloride being effective up to a dilution of 1–2,000,000. Animal experiments showed that up to the equivalent of 10 gr. of emetine hydrochloride hypodermically for a man of 70 kilos was harmless, but up to 15 gr. killed, while the equivalent of 4 gr. for a man, when given intravenously killed a rabbit at once. Clinical tests with the two alkaloids and their mixtures in amœbic dysentery were parallel in their results with their action on paramœcia, the emetine hydrochloride being the best for ordinary use, and the mixed alkaloids being effective in proportion to the emetine in them. He now advises 1-gr. doses of emetine hydrochloride in adults, although $\frac{1}{2}$-gr. ones may be commenced with for the first day. Intravenous injections are rarely necessary. Symptoms of diarrhœa and 'indigestion' in the tropics are often due to amœbic disease, and rapidly curable with emetine. At the same discussion[28] D. Munro recorded cases of the successful use of emetine in amœbic dysentery; C. B. Seal used it effectively in the same disease in the Darjeeling District, H. Markham Carter in Bombay, A. Whitmore in Rangoon, A. Hootan and C. T. Hudson in Central India, and E. C. G. Maddick in Ahmednagar.

American workers record equally satisfactory results from the use of emetine. Thus, Jerome Wagner,[29] after referring in detail to the work of Vedder, Rogers, and others, records some very striking cases in which *E. histolytica* was found, and the ulcers in the rectum watched with the proctoscope. Half-grain doses were given daily for one week. In no cases were amœbæ found after twenty-four hours, by

which time the daily stools had been reduced from fifteen or twenty to one or two, which became formed in three days. At the end of the week the proctoscope showed little signs of ulcers remaining, however numerous they had been at first. No vomiting or nausea occurred, and there was no local trouble. They conclude that the "immediate action of the drug must be described as nothing short of marvellous and gratifying." Previously, ipecacuanha had given uncertain results, and Lynch had performed appendicostomies in one hundred cases with ultimate success from irrigations of the bowel, the appendicostomy wound not being closed on the average in less than two years. The results now obtained with emetine appear to show that the day of this operation in amœbic dysentery is over. The action of the drug is so rapid that its effect is of diagnostic value, and every case of persistent diarrhœa should be treated with it, as it is harmless in non-amœbic cases. Cases occasionally relapse, so that intermittent use of the drug is advisable. L. J. Rosenthal[30] in nine cases obtained very similar results. Pruritus was noted in a few instances. After two or three injections the rectal ulcers showed signs of healing, and disappeared in a week or ten days. All the patients rapidly gained weight, and were soon able to take a more liberal diet. Patients should be kept under observation, so that any recurrence may be promptly treated. F. W. Dudley has had better results with emetine even than with ipecacuanha, in both amœbic dysentery and hepatitis. In one case severe pain in the back resulted. If given by the mouth, the same precautions are necessary with emetine as with ipecacuanha, to prevent vomiting. On the average, twenty-five daily injections were necessary to produce a cure.

M. L. Legane[31] discusses the diagnosis and emetine treatment of amœbic dysentery at length, and gives a good account of the subject. When direct examination of the stools for amœbæ fails, he thinks rectal injections of portions of them into cats is of diagnostic value by producing the disease in the animals in two or three days, with numerous amœbæ. Disinfection of dysentery stools is necessary to destroy the encysted form. Emetine hydrochloride in doses of not less than 4 cgrams (0·6 gr.), and up to 8 cgrams daily for eight days, is effective in an adult. It also prevents liver abscess if given in time; but if pus is formed, either Rogers's plan of aspiration or hepatotomy is necessary to remove the pus. To prevent recurrences due to the encysted stage resisting emetine, the drug should be repeated after ten to fifteen days. Chronic constipation may remain and require treatment.

R. Brooke,[32] in the Philippines, had found ipecacuanha, and recently emetine, the most useful drugs in amœbic dysentery, while a draining liver abscess may rapidly heal under their influence. Quinine has also been much used in amœbic dysentery, and he thinks its action is a general rather than a local one. He has therefore employed **Quinine Sulphate** in doses of 22 to 30 gr. daily by the mouth for periods of six days with encouraging results in ten chronic cases, although some of them relapsed.

P. I. Nixon[33] has tried infusions of the plant **Chaparro Amargosa** in Texas in ten cases of amœbic dysentery with success. The infusion killed the amœbæ in solutions of 1–1,000,000 in from one to three minutes.

For the value of **Emetine** *see also p.* 14, and **Quinine,** *p.* 28.

REFERENCES.—[1]*Phil. Jour. Sci. B. Trop. Med.* 1913, 253 ; [2]*Amer. Jour. Trop. Dis.* 1913, 197 ; [3]*Ibid.* 351 ; [4]*Ibid.* 431 ; [5]*Jour. Amer. Med. Assoc.* 1913, ii, 675 ; [6]*Presse Méd.* 1914, 229 ; [7]*Brit. Med. Jour.* 1914, ii, 118 ; [8]*Jour. Trop. Med.* 1914, 227 ; [9]*Ibid.* 244 ; [10]*Ind. Med. Gaz.* 1914, 88 ; [11]*Ibid.* 97 ; [12]*Ibid.* 107 ; [13]*Ibid.* 108 ; [14]*Ibid.* 101 ; [15]*Ibid.* 85 ; [16]*Ther. Gaz.* 1914, 390 ; [17]*Jour. Trop. Med.* 1913, 345 ; [18]*Brit. Med. Jour.* 1914, i, 1122 ; [19]*Jour. Trop. Med.* 1914, 33 ; [20]*Brit. Med. Jour.* 1913, ii, 1058 ; [21]*Ann. Surg.* 1914, 891 ; [22]*Jour. Amer. Med. Assoc.* 1914, i, 501 ; [23]*N. Y. Med. Jour.* 1914, i, 327 ; [24]*Jour. Trop. Med.* 1914, 161 ; [25]*Jour. Amer. Med. Assoc.* 1914, ii, 534 ; [26]*Münch. med. Woch.* 1914, 241 ; [27]*Ind. Med. Gaz.* 1914, 85 ; [28]*Ther. Gaz.* 1914, 390 ; [29]*Ind. Med. Gaz.* 1914, 85 ; [30]*Med. Rec.* 1914, i, 190 ; [31]*Presse Méd.* 1914, 465 ; [32]*Jour. Amer. Med. Assoc.* 1914, i, 1009 ; [33]*Ibid.* 1530.

AMPUTATIONS. (*See also* GANGRENE.) *F. W. Goyder, F.R.C.S.*

Cumston[1] says that *Moszkowicz's sign* is an important means of estimating the proper level of amputation in cases of gangrene of the limbs. Its use should be limited to cases of gangrene due to vascular occlusion. A rubber band is applied to the roots of the affected and sound limb, sufficiently tight to obliterate the pulse, and the rapidity of spread and the degree of colour of the cutaneous hyperæmia are compared when the bands are simultaneously removed. Attention to detail is important. The patient is placed on his back, the limbs to be compared are raised till venous blood is expelled, after which the bands are applied. If the vertical position causes much pain the venous blood may be expelled by an elastic bandage. A flat rubber band is preferable to Esmarch's tube ; it should be left on for at least five minutes. The bands are removed simultaneously and the limbs laid flat. A uniform dark-red blush normally invades both limbs from the point of compression to the tips, travelling with equal rapidity on both sides. With arterial occlusion the characters of the hyperæmic wave are altered: (1) The uniform blush may cease at the level of the vascular occlusion ; (2) The hyperæmia may be paler on the diseased side, and may gradually fade away as it travels downwards ; (3) It may suddenly change from a dark red to a pale pink at a certain level ; (4) The cutaneous hyperæmia may be delayed in its appearance on the affected side ; (5) The rapidity of travel may be the same as on the sound side. At a distinct point the dark red may change to a paler colour, which progresses slowly. In vascular occlusion, the lower limit of the hyperæmic wave represents the point below which the tissues are no longer nourished, and amputation should be performed 'quite a little' above it.

Amputations of the Leg.—Binnie[2] points out that the level at which an amputation of the leg is performed below the knee has no influence on the vital dangers of the operation ; hence the choice as to the method and site of amputation depends, first, on the lesion, and,

second, on the use which is to be made of the stump. Amputation for malignant disease of a bone must remove the whole of that bone. The level of an amputation for gangrene may be determined by the use of Moszkowicz's sign. The line where the descending blush pauses, corresponds to the site of arterial obliteration, and amputation should be performed well above it. Sandrock's method is much simpler: Scrub the leg vigorously in preparing for operation. Note the reaction of the skin to the scrubbing. A well-nourished skin becomes diffusely red, and this flush stops more or less abruptly at the poorly nourished level. If the financial condition of the patient is such that he cannot afford an expensive artificial limb, it is of vast moment to save as much of the limb as possible, and to provide him with a stump which will withstand abuse, and on which the weight of the body can be directly supported without harm resulting. If it is safe and feasible to leave enough of the foot that a shoe can be worn comfortably and use can be made of the ankle joint, there is no doubt of the propriety of such an amputation. An artificial foot can be fitted to any good form of ankle amputation, but is said not to be so satisfactory or efficient as one fitted to a supramalleolar amputation. The causes militating against good weight-bearing capacity of a stump are, adhesion of the skin, inefficient covering and irregularity of the end of the bone, stump neuromata, and inclusion of nerve-endings in scar tissue. When the skin flaps have been cut and allowed to retract, the deep fascia should be divided at this level and reflected with the skin. When the bones are divided, they should be stripped of their periosteum for a short distance, as periosteum appears to be one of the sources of tenderness in stumps. When the wounds have healed it is wise to subject the stump to a certain amount of therapeutic abuse. Even a poor stump can be made to gain good weight-bearing capacity by repeated blows followed by elevation of the limb. Osteoplastic methods produce a larger proportion of weight-bearing stumps, even if there has been infection. The author finds that Bier's amputation is needlessly complicated. He covers the cut end of the tibia with a free transplant of bone; but such an operation is entirely out of place unless asepsis can be assured and the resisting power of the patient is satisfactory.

Amputations of the Hand.—Kuzmik[3] says that the surgical treatment of amputations and exarticulations in recent years has been as conservative as possible. This attitude is especially important with regard to the preservation of the upper extremity, the hand and the fingers, the loss of which cannot yet be replaced satisfactorily. Our aim should therefore be to save the hand and its smallest parts by exercising great patience and care, and by the use of all the scientific means at our disposal. Limited mobility, ability to use the fingers, and a stiff wrist, represent much progress as compared with amputation. A conservative procedure should always be tried before resorting to more drastic measures. In acute processes, many hands and

fingers have been restored to their full working capacity by means of a prompt, energetic, but cautious operation, care being taken not to injure the bone, the tendon sheath, or the joint. However justifiable in acute inflammatory processes prompt, energetic, but cautious measures may be, an attitude of patient observation is both advisable and justified in the case of chronic, and especially tuberculous, processes. Good results have been obtained, particularly in surgical tuberculosis, by means of Rotter's heliotherapy. Now that this method can be successfully applied to the hand, it is our duty to try it freely. He mentions cases in which absolute rest and isolation have cured hands considered incurable owing to tubercle of the carpus or metacarpus. In tuberculous cases, where there is a limited amount of bone affected, an attempt may be made to replace the diseased by healthy periosteum-covered bone. In this way the finger deprived of its support is saved. Insolation can also be supplemented by specific vaccinations. If amputation is necessary, the cicatricial line should fall on the least exposed part of the stump. The scar must not be on the palm; in the fingers, the sense of touch is impaired by scars on the flexor aspect. The stumps of the tendons should be united over the stumps of the bones. Langenbeck's subperiosteal method of amputation does not prevent the formation of exostosis and large masses of callus. Osteoplastic covering of the bone has got rid of this difficulty. Ritter covers the bone with fascia. This procedure also prevents callus. Both methods are useful in the hand and fingers. If, in a given case, the thumb is sound and the fingers are to be removed, the stumps of the fingers should be enucleated if the patient is a workman; in a patient of the wealthier class, parts of the first phalanges should be saved, so as to avoid displacement of the artificial fingers when covered by a glove. If single fingers are to be removed, the head of the metacarpal bone must also be taken away, as its presence interferes with the grasp. In removing the hand, the styloid process may be left if the flap be thick; otherwise it should be removed. The radio-ulnar joint should not be interfered with.

REFERENCES.—[1]*Ann. Surg.* 1914, i, 645; [2]*Ibid.* ii, 160; [3]*Ibid.* 155.

ANÆMIA.

Blood transfusion for (*p.* 5). Elarson (*p.* 12).

ANÆMIA, PERNICIOUS. *Herbert French, M.D., F.R.C.P.*

DIAGNOSIS.—Goodall[1] draws attention to the fact that pernicious anæmia should be looked for if it is to be detected before it actually stares one in the face. The diagnosis in a late stage may be obvious; but, on the other hand, a large variety of symptoms, including vague ill-health, chronic dyspepsia, cardiac debility, intermittent anæmia, pigmentation of the skin, changes in the urine, neurasthenia, neuritis, spinal sclerosis, mental derangements, and probably a host of others, may be the earlier manifestations, the nature of which may remain obscure for some time if blood-counts are not carried out almost as a

routine practice. He records illustrative cases, such as one which at first simulated gastric carcinoma, and then developed acute mania ; another in which cardiac disease simulated pernicious anæmia ; another in which severe respiratory complications and neuritis were the prominent features ; another which closely simulated Addison's disease ; and another simulating acute yellow atrophy of the liver. In all of these, blood-counts showed that pernicious anæmia was the actual diagnosis.

Treatment. — The number of cases of pernicious anæmia treated by **Splenectomy** is increasing steadily. The greater part of the literature of the subject up to the end of 1913 is given by Türk[2] and by Port.[3] Though some have done well for a time, more recent cases do not support the view that splenectomy is superior to, or even as good as, other less drastic methods of treatment.

Coleman and Hartwell[4] report the case of a man, age 27, in his second relapse. The spleen came three fingers' breadths below the costal margin ; other methods of treatment failing, splenectomy was resorted to. At the time the case was reported, six months after the operation, the patient had only just reached the point of being able to sit up, so that recuperation had been very slow ; the improvement was definite, however, and this was after a second relapse, when ordinary measures had ceased to be beneficial.

Harpole and Fox[5] report a case in a man, age 40, in which the pernicious anæmia was going from bad to worse under ordinary medical treatment. As the spleen was easily palpable, it was decided to excise it. Sixty days after the splenectomy acute appendicitis supervened, with rupture of the vermiform appendix and diffuse peritonitis requiring a second laparotomy ; this delayed recovery considerably, but the patient became well enough to travel by himself, and he was pleased with the result, though the red corpuscles at the time the case was published do not appear to have reached a higher figure than 1,412,000 per c.mm.

Flörcken[6] reports two cases of splenectomy for pernicious anæmia. In one, death resulted an hour after the operation ; in the other, the red corpuscles rose to 5 million per c.mm. three months after the operation, and, for the time being at any rate, the patient seemed to have become perfectly well. A relapse was to be expected later, however, to judge from the results in most previous cases, although Huber[7] was able to show a female patient, age 34, four years after splenectomy for pernicious anæmia ; she was still comparatively well, and much better than before the operation, though it could not be said that she had ever recovered perfect health. The fact that splenectomy, though it often relieves, does not cure, pernicious anæmia, indicates that the pathology of the disease depends only in part upon excessive hæmolysis by the spleen.

Decastello[8] records four cases of his own, in all of whom great improvement in the general condition and in the blood picture set in within four months of splenectomy ; but in one of them, though the

red cells had at one time risen to over 4 million again, a profound relapse had already set in six months after the operation. Port,[9] on the other hand, speaks enthusiastically of the result in one fresh case of his in which the red corpuscles were less than a million before the spleen was excised, but nearly 4 million per c.mm. two months after the operation ; whilst at the same time the urine ceased to contain urobilin, though previously rich in it. His case is recorded at only a very short interval after the splenectomy, however, and relapse seems more than probable.

Mühsam[10] has had four patients suffering from pernicious anæmia treated by splenectomy. The first died two days after the operation. The second improved greatly, the red corpuscles, which had been 1½ million, numbering 2½ million per c.mm. and the hæmoglobin measuring 65 per cent of normal six months after the operation. A third improved only moderately, but six months after the operation was better than before it. The fourth, whose red corpuscles were 1 million per c.mm. before the operation, improved very little, if at all, death occurring ten weeks after the splenectomy.

Thorium-X has been tried by one or two observers in cases of pernicious anæmia, and both Arneth[11] and Flörcken[6] speak favourably of its effects ; their figures, however, do not seem to indicate that it is better than, or even so good as, arsenic in this connection.

References.—[1]*Med. Press and Circ.* 1914, ii, 6 ; [2]*Deut. med. Woch.* 1914, 371 ; [3]*Berl. klin. Woch.* 1914, 546 ; [4]*Med. Rec.* 1914, ii, 1160 ; [5]*Surg. Gyn. and Obst.* 1914, i, 243 ; [6]*Münch. med. Woch.* 1914, 1280 ; [7]*Berl. klin. Woch.* 1913, 2179 ; [8]*Deut. med. Woch.* 1914, 639 and 692 ; [9]*Berl. klin. Woch.* 1914, 546 ; [10]*Deut. med. Woch.* 1914, 377 ; [11]*Berl. klin. Woch.* 1914, 153.

ANÆMIA, SPLENIC. (*See* Banti's Disease.)

ANÆSTHETICS. (*See also* Eye, General Therapeutics of.)

J. Blumfeld, M.D.

Rectal Anæsthesia.—The older methods of administering **Ether** per rectum never attained wide recognition or use, chiefly because the risk of serious damage to the mucous membrane of the bowel was not eliminated. By the recently introduced modifications in technique and procedure,[1],[2] it is claimed that this risk is obviated and that successful narcosis can be relied upon. Wallace has undertaken experimental work upon animals and, based upon the knowledge thus obtained, a clinical method has been arrived at and employed by Gwathmey. At the International Medical Congress in London this anæsthetist recommended carron oil as the vehicle for the ether, because this parts with the ether in about one-fourth of the time taken by other oils. As a result of experience, however, Gwathmey has now entirely abandoned carron oil and uses **Olive Oil** instead. Graham has shown that the absorption of olive oil into the system after operation restores the opsonic index lowered by inhalation anæsthesia.

Gwathmey claims several advantages for oil-ether anæsthesia. Some of these are distinctly arguable, as, for instance, that " the element

of apprehension and fear caused by placing a mask over the face is avoided." There are probably just as many people who would be apprehensive and fearful of a rectal injection as of a mask skilfully and considerately applied to the face. The after-effects are said to be reduced to a minimum, and more complete relaxation to be produced than by any other known method of administration. Further, it is claimed that the limits of safety are widely extended, and a more even plane of anæsthesia automatically maintained. These claims are based upon the observation of a hundred cases in which the ages of the patients ranged from four to seventy-one years. Illustrative details of cases are given, the most convincing example being one of excision of tongue, floor of mouth, and glands of neck for malignant disease, when the operation lasted three hours, the patient returning to bed with a pulse of 72 and making a good recovery. Gwathmey states that if cyanosis occurs it indicates an unnecessary depth of narcosis, and that the lid reflex should be active. He believes that with this method a sensory paralysis of the extremities precedes the effects upon the higher centres of the brain. Consciousness is regained, he states, long before the sensations of pain are manifested. Owing to this last fact the procedure may be employed for the relief of pain, just as in the hypodermic injection of morphia. The method is especially indicated, says Gwathmey, in bronchoscopic work, Graves's disease, and operations upon the head and trunk. Also it may be employed with confidence in the case of those who have suffered much nausea and vomiting from previous administrations of ether by other methods. It is contra-indicated in the presence of colitis, hæmorrhoids, fistula, or other pathological conditions of the lower bowel. Directions for using the method are as follows : For children under six years of age a 50 per cent solution of olive oil and ether should be employed, allowing one ounce of this mixture for every twenty pounds of body weight. It is non-irritating, and no preliminary medication is required. For patients of six to twelve years use a 55 to 65 per cent solution, allowing twenty to thirty minutes for the full effect—one ounce to twenty pounds of body weight as before. From twelve to fifteen the same amounts and percentage are used, but preceded by morphia gr. $\frac{1}{12}$ and atropine gr. $\frac{1}{200}$. From fifteen years upward a 75 per cent solution is employed. For adults Gwathmey uses chloretone 5 gr. dissolved in ether 2 dr. and mixed with an equal quantity of olive oil given as a preliminary rectal injection thirty minutes before operation. In addition, for athletes and alcoholics he employs morphine and atropine. Purging beforehand is avoided, but the colon is irrigated till the return is clear. The apparatus required consists of a small catheter and funnel into which to pour the ether mixture, two small rectal catheters inserted side by side to withdraw the fluid and irrigate the colon, and a towel which is placed on the face of the patient from time to time to prevent the dilution of the anæsthetic in the air-passages. This is withdrawn when the necessary degree of narcosis is reached. At least five minutes should be passed in

administering eight ounces, the usual amount required. The tube is not withdrawn until the patient is partly unconscious and the muscles are relaxed. From five to twenty minutes are allowed for the anæsthetic to take effect, according to the percentage strength of the mixture employed. If loss of lid reflex, stertor, or cyanosis appear, two or three ounces of the mixture are to be withdrawn. At the end of the operation the two small rectal catheters are placed as high up the colon as convenient, and cold-water soapsuds injected into one and withdrawn through the other.

The depth of narcosis is automatically maintained by four factors :[3] (1) The rate of evaporation of ether from the oil, which is constant in normal individuals. If a body temperature of over 100° is present, a smaller amount of the mixture is required. (2) When the colon is fully distended not so much ether is absorbed. (3) As the ether leaves the mixture both this and the gut are cooled off. This retards both elimination and absorption. This process does not affect the temperature of the patient, which remains constant. (4) The difference between the absorptive power of the colon and the eliminative capacity of the lungs. But for the residual air in the lungs it would be impossible to maintain anæsthesia by this method.

Rectal anæsthesia by means of **Isopral** has been tried in a few instances,[4] but does not appear to have given great satisfaction, owing to the ease with which dangerous symptoms arose. The method of injection of warmed ether vapour[5] appears to be more complicated and less efficient than the oil-ether procedure.

Intratracheal Insufflation has maintained a firm footing as an admirable method of anæsthesia in selected cases. During the past year much work has been done in the direction of designing new or modifying already existing apparatus. Although simpler,[6] some of the new forms of apparatus do not appear to be in all respects the equals of those already in use. Of these, the most recent form of Shipway's apparatus[7] comprises all the particular features necessary in a complete insufflation instrument and is, moreover, comparatively light and portable. The chief objection to the wide use of insufflation, except in expert hands, lies in the difficulty that may be experienced in introducing the catheter. It is pointed out[8] that from this point of view patients may be divided into two classes : those in whom it is possible, and those in whom it is impossible, to reach the epiglottis with the finger and introduce a tube without direct vision. The authors of the article referred to[8] picture their own very simple but rather unstable-looking form of apparatus.

For several excellent illustrations of what appears to be a remarkably compact and complete form of apparatus the reader is referred to an article by Henry Janeway.[9] This authority has devoted attention to the question of the administration of nitrous oxide and oxygen by insufflation in a manner similar to that in which up to the present ether alone has been given. He has devised[10] an inflatable rubber-bag placed around the tracheal catheter in order to avoid undue dilution

with air of the ingoing gases. Corresponding changes in the apparatus are required to provide for expiration, which takes place ordinarily between the catheter and the trachea. Moreover, there is in the apparatus a bag for re-breathing, which plays an important part in Janeway's method of administration, and an arrangement by which the breathing can either be natural or of the nature of artificial respiration. When the latter system is in vogue, it is stated that great care must be exercised that there be no suction with the expirations. If this should occur there is probability of serious pulmonary collapse. With the chest wall open as in intrathoracic surgery, it is absolutely necessary to depend alone upon the elasticity of the lungs for expiration and to avoid artificial suction. The method can be used in connection with a tightly-fitting mask, and without an intratracheal catheter. The efficiency of nitrous-oxide anæsthesia is increased by the method, because the gas can be adminstered under conditions of increased pressure, and because morphine can be used with greater freedom owing to the absence of risk of respiratory depression, this being counteracted by the mechanical artificial respiration.

Intrapharyngeal Administration of Warmed Ether Vapour[11] may be regarded as an offshoot of intratracheal insufflation, since it is best practised by the use of an insufflation apparatus, the tracheal catheter being replaced by nasal tubes. After anæsthesia has been induced in the ordinary way, indiarubber catheters of suitable size are passed through the nares into the pharynx behind the tongue ; they are coupled up with the delivery-tube of the insufflation apparatus by means of a V-piece, and the warmed ether vapour is delivered over the glottis. Page has found the method excellent for cleft-palate cases, and it enables ether to be used advantageously in the case of infants.

Alkaloidal Narcosis as an adjuvant to general anæsthetics has firmly established itself with many anæsthetists. The extent to which alkaloids are used, and their precise nature, varies with different authorities, and there are not many who choose to rely solely upon the narcosis produced by morphia and scopolamine as still practised by some obstetricians in Germany, where the ' twilight sleep ' form of anæsthesia has a considerable vogue. That this kind of narcosis can be made efficient for ordinary surgery has been proved, but the preliminary steps are rather numerous and the prolonged stupor is not always desirable, nor is the anæsthesia superior to that produced by the more usual agents. The beneficial effects of a single preliminary injection, however, are often marked. This injection may be of **Morphia and Atropine,** of **Atropine** alone, of **Morphia, Scopolamine, and Atropine,** or of **Omnopon,** or of this with the other two. There are undoubtedly some persons who are prejudicially affected by scopolamine. Generally speaking, for routine use before anæsthetics, atropine is the most valuable drug. It facilitates the free use of ether by keeping the patient ' dry ' as regards secretions, and diminishes shock and after-sickness.[12]

In connection with parturition the combined use of **Omnopon** and

Pituitary Extract is strongly recommended, the extract being used to strengthen the 'pains,' whilst the omnopon banishes their painful character.[13] Much care is necessary with these injections, as highly toxic symptoms have been seen after only 2 cgrams of omnopon. Similarly, when scopolamine and morphia are used together the respirations may be so markedly affected that they have been known to fall to six a minute, and that over prolonged periods of time. Such a condition is undesirable, for the ineffectual lung ventilation may easily be followed by serious consequences. The peculiar effect of repeated injections of these two drugs during labour, by which, though the pains are apparently appreciated at the time, yet all remembrance of them is abolished, is well known. Between the pains the patient sleeps quietly, and if the 'twilight sleep' is properly induced, the whole of the processes of labour are brushed from memory.[13] There appears, however, to be no doubt of the prolongation of labour which this method of narcosis entails, or of the peculiar condition of the infant often present at birth, a condition which allows of normal respiration only after some hours.

In connection with the use of alkaloids, Giuseppi pointed out at the International Congress that, if tabloids are employed, they should not be dissolved in tap-water, as hard water precipitates alkaloids; he attributed many anomalous results to neglect of this precaution. The instability of scopolamine solutions has also been a trouble to those who employed the 'twilight sleep,' and as a result of chemical experiment Straub believes that a durable solution has been obtained with the help of 'alcohol mannite.'[14] With regard to atropine and morphia, Hornebrook states that the usual dosage is often too high. His routine dose is gr. $\frac{1}{8}$ morphia and gr. $\frac{1}{150}$ atropine for adults.

The possibility of *Accurate Dosage*,[15] the securing of which has resulted from so much laborious experiment in the case of chloroform, has become a question of importance with regard to ether too. The necessity is not the same in the two cases, owing to the much lower toxicity of ether; but there is much strength in the contention that perfectly even anæsthesia and minimum after-effects can be attained only by scientific accuracy in the strength of vapour supplied. This precision can only be reached by insufflation methods, by which alone the percentages of ether and of air supplied to the patient can be accurately regulated. The insufflation may be limited to the pharynx, and need not necessarily involve tracheal catheterization. The article referred to gives a detailed account of the method, and elaborate tables which supply information as to the ether-vapour pressure and the zones of narcosis corresponding to the different dosages.

Intravenous Anæsthesia has not apparently been the subject of any recent improvements, but its use has received fresh commendation on several hands. Honan and Hassler,[16] employing a technique and apparatus similar to that made familiar by Rood, are enthusiastic as to their results, although they state a mortality of one in 350 cases. They use a 5 per cent solution of thymol in carbon tetrachloride for

sterilizing the skin of the arm before incising the vein, and the anæsthetic solution (5 to 7·5 per cent **Ether** in normal saline) is kept at 85° F. They believe that actual exposure of the skin and tying in the cannula are more satisfactory than the introduction through the skin of a hollow needle as in salvarsan injection. The solution should be administered at a full flow at first, the stream being reduced with the onset of symptoms of anæsthesia ; this occurs, according to their statement, in from one to five minutes. When the required degree of narcosis is obtained. the solution is applied at the rate of about 40 to 60 drops per minute. As much care is required in maintaining the freedom of the respiratory air-way as in inhalation anæsthesia, otherwise sucking back of the tongue and relaxation of the jaw muscles may seriously impede elimination of the anæsthetic. The expenditure of solution is about 1000 c.c. per hour. After operation the patient is propped up and placed on alternate sides every two hours to lessen the chance of pulmonary œdema. The authors have tried paraldehyde and ether, but given it up owing to an irritation of the larynx and spasmodic type of respiration which accompanied its use. They speak more highly of a solution composed of a 1·5 per cent solution of **Isopral** in Ringer's solution, together with a 5 per cent solution of ether. Some blood changes were noted—clumping and crenation of red cells—but in every case the blood-picture returned to normal in about four hours. Kümmel[17] warmly recommends intravenous infusion for head and neck cases, having used it with much satisfaction in 30 cases of tumour of the upper jaw, larynx, tongue, tonsil, etc. Headache, vomiting, and other disagreeable after-effects never follow, he says, upon this method of anæsthetization. Scopolamine and morphia were always used as a preliminary in adult cases. He also speaks highly of the combined use of isopral and ether.

Spinal Analgesia receives warm support from Babcock,[18] who has used it for some years, and writes of his experience in over 3000 abdominal and pelvic cases. **Stovaine** has been chiefly employed. He ascribes the fall in blood-pressure witnessed during spinal analgesia to several factors : (1) The pressure influences to the cord are interrupted, and there is a vasomotor palsy in the involved segments ; (2) The limitation of respiratory movements reduces the normal aspirating influence on the venæ cavæ, and the right auricle and therefore the other cavities of the heart, fill slowly ; (3) The inhibitory influence of the vagi on the heart continues and is largely unopposed ; (4) The powerful normal stimulus to vigorous heart-action is largely lost with the fall in blood-pressure. No other anæsthetic, according to this authority, produces such a complete vasomotor relaxation. For this reason he thinks it should not be employed during severe shock : just the circumstances under which some authorities find its greatest value. The best antidote for the fall of blood-pressure is the intravenous injection of normal saline. Babcock adds 2 to 10 min. of epinephrin to each 6 oz. of solution. Spinal analgesia has a special value in operations on the kidney and on the bladder.[18]

Parasacral Anæsthesia,[19] a form of spinal analgesia in which the sacral plexus is anæsthetized by injections through the foramina, has been tried in a small number of cases of the nature of colporrhaphy, ligature of hæmorrhoids, urethrotomy, etc.

Regional and Local Analgesia.—The attention given to these forms of anæsthesia is greater on the Continent than in this country or America. The reason for this is most likely that in France and in Germany there is no class of medical man devoting himself entirely to the administration of anæsthetics, as do the recognized anæsthetists in every large centre in Great Britain and America. Consequently the results of general anæsthesia are less satisfactory, generally speaking, abroad, and the surgeon is more eager to avoid its use and to find methods capable of being employed by his own hands. The recent books, therefore, on local analgesia are of Continental origin. Another factor which militates against the free use of regional analgesia in hospital practice is the amount of time required for the process. It is, however, a very satisfactory proceeding in numerous cases of superficial operations, and those upon the limbs or parts where the main nerve trunks supplying the operation area are readily accessible for injection. An unusual case of collapse following supraclavicular anæsthetization of the brachial plexus is detailed in an article by Neuhof,[20] which gives a good account of the technique of this procedure. The danger of piercing the subclavian artery appears to be easily avoidable. Temporary paralysis of half the diaphragm through involvement of the phrenic nerve in the injection has been reported several times.

A new technique for the injection of the *internal laryngeal* nerves, in order that the larynx may be rendered insensitive in those cases where cocaine application is not sufficient, is described by Courtenay Yorke.[21] He has employed it in fifty-five cases, and states that by this injection, combined with cocainization, he has never failed to render a larynx completely insensitive. The method is to be used (1) When cocaine will not induce complete analgesia, as in inflammatory and highly irritable conditions of the larynx; (2) When deep anæsthesia is required, as when using the actual cautery; (3) When the patient is unduly sensitive to the toxic properties of cocaine.

The question of *pain after operations performed with local analgesics* is sometimes formidable. W. Wolf finds **Pyramidon** an efficient anodyne for this.[22] He, like other German writers, is fond of the combination of local analgesia with narcotics such as omnopon. In an article upon anæsthetics in goitre operations,[23] Bainbridge gives the preference to local analgesia. He quotes several important authorities on behalf of his views, including Kocher, whose opinion in favour of no general anæsthetic in these cases is familiar. Berry prefers local methods for severe cases, if the patient is willing, and regards the main advantage of this as being that the patient can drink freely during and immediately after operation, a factor which he believes diminishes the tendency to post-operative tachycardia. There is no

doubt of the extreme risk of general anæsthesia in bad cases of exophthalmic goitre, and the marked preference for local methods on the part of those who have very large experience in this particular class of case must carry great weight. Perhaps the best mode of all of dealing with exophthalmic goitre is by the combination of local and general methods, after the manner of Crile. There is at any rate no doubt of the great help afforded by preliminary sedatives, and the personal influence of the anæsthetist should also play a large part in favourably affecting the patient's mental state, which is of unusual importance in these cases. Even the supporters of local anæsthesia admit that this method may place a greater strain upon the operator, whose work may be hindered by defensive movements of the patient when nerves are dragged upon or arteries ligatured. Whether the fatal tachycardia that sometimes follows these operations is more to be feared after general than after local anæsthesia is not plain.

Post-Operative Massive Collapse of the Lung is a condition which not very infrequently follows abdominal operations. It is probably the real cause of symptoms that are often attributed to ' ether pneumonia.' Several interesting discussions of the real pathology of the condition have appeared during the past year. The causation is attributed by Pasteur[24] to " reflex diaphragm inhibition," whilst others lay the chief stress upon retained viscid secretion in the bronchioles. Pasteur remarks that the explanation of acute lobar collapse by simultaneous blocking of the bronchioles of one lobe by secretion appears to be open to the following objections : (1) The inherent improbability of the limitation of an acute infective process to the whole of the bronchioles of a single lobe simultaneously ; (2) The complete absence in several of the recorded cases of any premonitory symptoms suggesting bronchial trouble ; (3) The appearance—within two or three hours of onset or even sooner—of greenish airless mucopurulent sputum : an order of events quite at variance with the appearances usually presented by the expectoration in the initial stages of acute bronchial inflammation ; (4) The rapid and complete disappearance of cough and expectoration in uncomplicated cases ; (5) The occurrence of well-marked cases of post-operative collapse without any cough or expectoration at all. These are the chief reasons, although others are given, advanced against the theory of blocking of bronchioles by viscid secretion being accepted as the chief cause of massive collapse.

References.—[1]*N.Y. Med. Jour.* 1913, Dec. 6 ; [2]*Lancet*, 1913, Dec. 20, 1756 ; [3]*Amer. Jour. Surg.* 1914, ii, 268 ; [4]*Berl. klin. Woch.* 1914, Feb. 2 ; [5]*Ibid.* 1913, 1934 ; [6]*Bristol Med.-Chir. Jour.* 1913, 547 ; [7]*Lancet*, 1914, ii, 104 ; [8]*Presse M d.* 1914, lx, 497 ; [9]*Ann. Surg.* 191, i, 628 ; [10]*Ibid.* 1913, ii, 927 ; [11]*Lancet*, 1914, i, 156 ; [12]*Ind. Med. Gaz.* 1913, 385 ; [13]*Univ. Med. Rec.* 1913, 481 ; [14]*Münch. med. Woch.* 1913, 2279 ; [15]*Ann. Surg.* 1913, lviii, 877 ; [16]*Ibid.*, 900 ; [17]*Surg. Gyn. and Obst.* 1914, xix, 334 ; [18]*Jour. Amer. Med. Assoc.* 1913, ii, 1358 ; [19]*Deut. med. Woch.* 1914, 174 ; [20]*Jour. Amer. Med. Assoc.* lxii, 1629 ; [21]*Brit. Med. Jour.* 1914, i, 1290 ; [22]*Centr. f. Chir.* 1913, xl, 1882 ; [23]*Ann. Surg.* 1913, 939 [24]*Lancet*, 1914, i, 1428.

ANEURYSM, SURGERY OF. (*See* Arteries, Surgery of.)

ANEURYSM, THORACIC. *Carey Coombs, M.D., M.R.C.P.*

Diagnosis.—The writer of this review describes[1] cases which show that an aortic aneurysm may be simulated by: (1) Simple, non-aneurysmal dilatation of the aorta, with or without incompetence of the aortic valves; (2) Localized aortitis implicating branch arteries and neighbouring structures; (3) Mitral stenosis.

In the first case, it is the widened aortic dullness and other direct physical signs that predispose to the error; in the second, indirect signs, as inequality of pulses. Mitral stenosis is sometimes imitative of aneurysm through the pressure effects that an enlarged left auricle compressing the left recurrent laryngeal nerve, or the œsophagus, etc., may produce; sometimes, also, so distinct a hypertrophy of the conus arteriosus dexter may arise as to simulate aneurysmal pulsation.

It is well to recollect these possibilities; to do so will of itself suffice to prevent many errors, and skiagraphy is of great service in distinguishing between a true sacculated aneurysm and its imitators.

Treatment.—Reports on **Wiring** of the sac of the aneurysm continue to be published. Of Hare's[2] three cases, one was killed on the railway after eleven months of relative activity following the wiring; a second was wired twice at an interval of over two years, and was known to be alive and well two years after the second wiring; while the third died seventeen months after the operation. Hare holds that these experiences bear out the optimism expressed by him in previous reports of other cases, since this procedure offers material hope of prolonging life and relieves pain. He says that only specially prepared wire should be used. Bowlby and D'Arcy Power[3] record a case in which a large intrathoracic aneurysm was wired by Colt's method. The patient died suddenly three months afterwards of backward rupture of the sac.

References.—[1]*Bristol Med.-Chir. Jour.* 1914, 26; [2]*Jour. Amer. Med. Assoc.* 1914, i, 1217; [3]*Clin. Jour.* 1914, Feb., 113.

ANGINA PECTORIS.

Papaverine said to be superior to amyl nitrite (*p.* 24).

(*Vol.* 1914, *p.* 114)—Various Continental physicians find **Theobromine**, given continuously, of value in warding off attacks.

ANGINA, VINCENT'S. **Salvarsan** has been found useful in (*p.* 31).

ANGIOMA. *F. W. Goyder, F.R.C.S.*

Morestin[1] describes a method of treatment suitable for extensive, diffuse, and pulsating angiomata of the face, which is particularly valuable in cases otherwise inoperable. It consists of preliminary ligature under general anæsthesia of the main arteries supplying the mass, usually the external carotid and its chief branches, and of the chief veins, usually the common facial. This is followed by infiltration around and into the substance of the mass of equal parts of alcohol 90 per cent, glycerin, and formaldehyde solution (strength not stated). As much as 12 c.c. have been employed. Intense

swelling of the cheek, eyelids, and lips occurs, which may persist for four or five days, after which it subsides rapidly, leaving a hard mass at the site of the original lesion. This gradually absorbs, leaving the tissues apparently normal. Sloughing may occur if care is not taken. To avoid this the periphery and deeper parts should be fully treated at the first sitting, and if necessary the remaining and more superficial parts may be treated at a second or third sitting without general anæsthesia, at intervals of about three weeks. Pressure should be made on the angular vein and the periphery of the tumour during injection, to prevent the risk of disseminating thrombi, although no case of this complication has occurred. For the same reason the eyelids are not suitable regions for treatment by this method. The cosmetic results appear to be excellent.

Reference.—[1]*Rev. de Chir.* 1914, i, 137.

ANKYLOSTOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

P. C. Conran,[1] investigating the distribution of the disease in North Nyassaland, found ova in the stools of 40 per cent of the plains people, and in 13 per cent of the hill tribes at a height of 4400 feet, and schistosomum infection nearly as frequently. Infants were much infected, and the mortality among them is high. Symptoms of melæna and dysentery frequently resulted from the latter infection, but not from ankylostomiasis. The most constant symptoms of the latter were pain and tenderness in the epigastric region, after which came dyspnœa, palpitation, weakness, and dizziness. The prevalence of the disease falls during the dry season, when the soil is partly disinfected by the custom of the inhabitants of burning off the grass. In the rains the infection increases.

A. G. Eldred[2] has continued Conran's work. Severe cases were very rare, and many who harboured the worms were good workers, while 60 per cent of the infected were healthy or only very slightly anæmic, and only carriers, so there appeared to be a very high racial immunity to the infection. Much is being done to improve sanitation by inducing the natives to use a simple pattern of latrine.

Treatment.—R. D. Keith[3] thinks this is not so simple as the textbooks would have it. He finds that if the hæmoglobin is in the neighbourhood of 60 per cent, the ova are easily expelled within a few days ; but when it is below 40 per cent, months of patient treatment will be required to effect a cure. He has come to the conclusion that daily 30-gr. doses of β-**Naphthol** the first thing in the morning are more effectual than eucalyptus or thymol. Starvation during the previous day is unnecessary and may be harmful. C. M. Fauntleroy[4] prefers **Thymol** to β-naphthol.

R. G. Archibald[5] describes a case in which large numbers of ankylostoma were expelled. As it was complicated by much enlargement of the spleen and liver and persistent fever, a **Vaccine** was made from a *B. coli* organism in the stools, two injections of which were followed by loss of fever and great improvement. He suggests that

secondary infection through the bites of the worms may account for many of the symptoms in some cases.

H. B. Day and A. R. Ferguson[6] record the results of a careful study of ankylostoma anæmia in the Cairo Hospital. The former's clinical experience is based on over 300 cases, all showing severe illness. The average percentage of hæmoglobin was 22, while in one-fifth it did not exceed 10 per cent on admission. The average colour-index was reduced to 0·4, and in no case did it approach the high figure typical of pernicious anæmia. No improvement resulted from treatment of the anæmia until the worms had been expelled. Indeed, marked chlorotic anæmia, resisting treatment, is practically diagnostic of the disease. The parasite was always demonstrated microscopically by finding ova in the stools, or obtaining developed larvæ in a culture after five days at summer temperature. To expel the worms he prefers a mixture of 3 or 4 grams of thymol with 3 grams β-naphthol. **Oleum Chenopodii** was effective, but it is expensive and has a very disagreeable flavour. Preliminary fasting and purgation with a saline the evening before are essential. The drug is given in divided doses the next morning, a purge two hours after the last dose, and the treatment repeated after four to seven days, preferably the shorter period. Some days later a fresh search for ova should be made. After expulsion of the worms a gradual rise in the hæmoglobin occurs, but this is more rapid if **Iron** is given. The rise in the hæmoglobin is then greater than that of the red corpuscles, so the colour-index increases. The stronger forms of iron, such as reduced iron, ferric perchloride, and ferrous sulphate, give the best results. Organic compounds of iron present no advantages, while preparations of hæmoglobin are generally useless, as is manganese. Eosinophilia is highest in the early period of infection, and may persist after the worms are expelled. The blood-pressure rises with the hæmoglobin. When fever is complicating the disease, as long as the temperature rises above 100° hæmatinics fail to improve the anæmia. Fever may be due to a secondary infection through the bites in the intestine, and be accompanied by a leucocytosis. Ferguson deals with the pathological changes in the bone-marrow, and points out that the conversion of yellow into red blood-forming marrow in the shafts of the long bones may be followed by a gelatinous atrophy. Response to treatment is then much less, and **Arsenic** is indicated to stimulate the marrow action.

Complications.—J. W. Jervey[7] has studied the eye changes in ankylostomiasis, but found nothing distinctive of the disease. J. A. Ferrell[8] deals with the prevalence of ankylostomiasis in the United States, and emphasizes its economic importance and its effect in retarding the development of children.

References.—[1]*Jour. Trop. Med.* 1914, 225; [2]*Jour. Trop. Med.* 1914, 209; [3]*Lancet*, 1913, ii, 1117; [4]*Amer. Jour. Trop. Dis.* 1914, 678; [5]*Jour. Trop. Med.* 1913, 260; [6]*Lancet*, 1914, ii, 82; [7]*Jour. Amer. Med. Assoc.* 1914, ii, 151; [8]*Ibid.* i, 1937.

ANTHRAX.

Salvarsan employed in (*p.* 32).

(*Vol.* 1913, *p.* 108)—French sums up as follows: "Although some cases may get well without more than conservative antiseptic treatment locally . . . . the method in which most trust can be placed is Sclavo's Anti-anthrax Serum."

APPENDIX, SURGERY OF. *E. Wyllys Andrews, M.D.* (*Chicago*).

Carslaw,[1] reporting a series of 100 cases of *acute suppurative appendicitis*, gives some valuable statistical results. The age varied from four to fifty-six years, but 72 cases were between ten and thirty years. The proportion of males to females was two to one. Sixty-three cases had no previous attack, 16 one, and 17 two or more previous attacks. In 5 cases there was no record. The duration of the symptoms before operation was from six hours to two months. The appendix was removed in 94 per cent. Its location was iliac in 48, retro-iliac in 26, and pelvic in 20. Twenty cases had one or more concretions. Perforation had occurred in 61 of the 94 appendices removed. The bacteriology and histology were ascertained in 74 of the 100 cases. The *Bacillus coli* was found in 65, or in combination with staphylococcus in 6; staphylococcus alone in 2 cases, and pneumococcus in 1 case. One-third of all the cases had the following complications delaying convalescence: Recent collection of pus in the wound, 2; secondary abdominal abscess, 1; pus from the rectum, 3; septic thrombus of meso-appendix, 6; acute intestinal obstruction, 1; post-operative distention, 14; fæcal fistula, 9; ventral hernia, 6; hernia in omentum, 1; gastro-intestinal hæmorrhage, 2; hæmaturia, 1; bronchitis, 3; bronchitis and pneumonia, 2; pneumonia, pleurisy, and empyema, 1; femoral thrombosis, 2; parotitis, 1; jaundice, 9. The mortality was 4 per cent.

Codman[2] presents an analysis of 93 consecutive operations for *chronic appendicitis*. The pathology of the appendix was shown in peritoneal adhesions, obliteration of the lumen, stricture of the lumen with dilatation, and the presence of concretion or foreign body. Reference is made to the value of Aschoff's recent monograph on the pathology of appendicitis. It would seem to show that 50 per cent of humanity have attacks of appendicitis. He gives definite statistics from autopsies. He advises appendicectomy almost as a routine in every child, and is not afraid of ridicule in taking this position. Codman found in 100 abdominal sections in the Massachusetts General Hospital for all diseases, that 71 per cent showed definite lesions of the appendix without previous diagnosis; and yet in his 98 cases diagnosed before operation, only 61 showed pathological evidence at the time of operation. The writer, therefore, concludes that routine appendicectomy would be logical in all persons, and urges careful laboratory examination of every appendix removed. There was no mortality in this series of cases. The writer also concludes that the importance of cæcum mobile, pericolic membrane, and so forth, has been over-estimated, but that local kinking of the appendix by sharp flexion is of etiological importance.

For the use of **Radiography** in the diagnosis of chronic appendicitis, *see p.* 57.

Andrews[3] describes the *operation for acute appendicitis* as performed by him in the Victoria Infirmary, Glasgow. The gridiron method of approach was employed without exception, it being seldom necessary to enlarge this incision by lateral cutting. The cases are grouped as (1) Gangrenous, in which no protection exists from infection of the general peritoneal cavity; (2) Those in which there is localized abscess, completely shutting off the cavity. The cases included 47 males and 38 females. The ages were from five to sixty-six years. The duration of the illness varied from fourteen hours to many days. The operator blames the physician for keeping cases until there is evidence of severe trouble. In the great proportion of those operated on the appendix was gangrenous. In one-third the appendix had perforated, and a coprolith was lying free in the general peritoneal cavity. The accompanying peritonitis was either local or general. It was often impossible to determine how far it has spread. In a smaller number of cases there was a localized abscess. In 80 of the 85 cases operated upon, the wound was closed without drainage: 57 of the 85 healed primarily. There were 7 deaths. The author lays stress upon the value of primary closure without drainage, in which position he says he has received little support, and condemns the tamponade or packing of these cases as an abomination.

Guibé[4] reports numerous cases of appendicitis with diverticulitis. The obstruction and inflammation of Meckel's diverticulum is frequent, sometimes this organ being free and sometimes adherent, and this adhesion may be natural or pathological, the natural form being that in which there is persistence in some degree of the embryonic mesentery communicating with the umbilical vessels and the omphalomesenteric canal. More frequently the adhesions are pathological or inflammatory in their origin. The infections and perforations of Meckel's diverticulum bring about symptoms closely resembling appendicitis, and most of the operations have been done under that diagnosis. It seems probable that both organs may have been seized on account of their proximity to the cæcum in certain cases of diverticulitis, and it is not always easy to determine which was primarily affected.

MacCarthy and McGrath,[5] of the Mayo clinic, report cases of *carcinoma of the appendix*. Twenty-two specimens were presented in a series of 5000 cases, only 5 of which were suspected at operation. The remaining 17 were discovered only on making routine laboratory sections, the neoplasm not being visible on the external surface, but always primary in the mucosa. The youngest patient was five years; the average age was thirty. Ninety per cent occurred near the tip. The average duration of symptoms was 3·3 years. One in every 225 appendices was carcinomatous. A later series of 3039 specimens gave 18 carcinomas, or 0·6 per cent. Surgeons are therefore urged to examine closely all appendices removed.

Lett[6] reports from the London Hospital numerous cases of *thread-worms found in appendices*. He has collated from the literature reports of 19 cases of thread-worms in 4000 operations for appendicitis, and quotes Ney, who found them in three cases out of every hundred, the divergence being accounted for by the fact that Ney's cases were in children only. In 200 post-mortem examinations on children, Still found thread-worms 38 times, and no less than 25 times in 38 operations for appendicitis. The symptoms where the history was complete were so characteristic that the writer makes the diagnosis of 'thread-worm appendicitis' before operation. The pain comes on suddenly and is severe; the temperature may be high; vomiting is frequent; the abdomen is very sensitive, and rigidity not so marked as is usual. The pulse is no quicker than could be accounted for by the associated temperature, and the child does not appear to be so ill. On opening the appendix at operation, more or less numerous thread-worms are found.

The same author, writing on the present position of acute appendicitis as seen in the London Hospital clinics, states that marked advance has been made in the last few years in the percentage of recoveries after operation. His table of statistics shows a drop in mortality in all operations from 17 per cent in the 1905 series to 3·2 per cent in the present series, thanks partly to better technique and partly to better selection of cases.

Skevington[7] reports two cases of *hæmorrhage from the deep epigastric artery*. Both occurred on the tenth day after operation for appendicitis. Prompt compression between the finger and thumb was employed until chloroform could be administered, when deep sutures were placed around this vessel. One case ended in recovery. In both, the vessel was reached by vertical incision through the rectus sheath.

Elworthy[8] takes issue with those who oppose early operations for appendicitis. He reports numerous successful cases of early operation, and has failed to observe any bad results.

In von Eiselsberg's clinic in Vienna, Philipowicz[9] analyzes the question of the diagnosis of *appendicitis in old age*. The enormous frequency of the disease in proportion to other abdominal troubles makes its recognition of supreme importance. Loebl estimates the frequency of appendicitis below the age of fifty-one as 3·66 per cent, whereas above that age it is but 2·6 per cent. The oldest patient in their series was 93. Of this series, 60·4 per cent were males. The etiological factors most obvious were obstipation, flexion of the bowel, and hernia formation in old people. The series of cases reported includes 29 operations. The mortality was 7 per cent; 0·5 per cent were due to carcinoma, not of an acute, but rather of a very slow, chronic type.

Gray and Mitchell[10] report a series of *appendicitis cases in children* in the Aberdeen Infirmary. The total number reported are 200, of which 74 were chronic and the remainder acute. The mortality in

the entire series was 15 per cent. None of the 74 internal cases ended fatally. Two deaths occurred from intestinal obstruction, 2 from subphrenic abscess, and 1 from empyema of the chest. The remaining fatal cases were from peritonitis or multiple abscess. No cases of pneumonia or bronchitis or 'delayed anæsthetic poisoning' were met with in this series.

White[11] discusses the symptoms caused by *contracture of the psoas parvus muscle simulating acute appendicitis*. In six cases there was tenderness so nearly in McBurney's point as to lead to difficulty in the differential diagnosis. The great tenderness present in several of these cases masked the other classical symptoms of rigidity, localized pain, or tumour. Operation showed no appendicitis, but one form of pathology or another in the belly or fascia of the psoas parvus, sometimes in the form of bands of adhesions. These bands could be felt, and could be divided by opening the posterior peritoneum. In one of these the abdomen was flaccid, but the tumour could be felt in the right iliac fossa. Operation disclosed a band which, upon being cut, relieved the symptoms.

Murray,[12] from observations made in Liverpool, draws certain conclusions as to the *geographical distribution of appendicitis*. The disease, he thinks, is met far more frequently than twenty years ago. Through correspondence, and observations made by competent physicians in various parts of the world, the writer takes the reader in what he calls an appendicular trip around the world. Letters are published from Morocco, Central Africa, Jerusalem, Damascus, Borneo, China, North and South Manchuria, New Guinea, and nearly all the Oriental countries, showing the relative prevalence of the disease in various parts of the world. He also quotes observers as to the frequency of appendicitis in animals, and cites various letters and observations on monkeys and numerous carnivorous and graminivorous wild animals. Nineteen cases in various animals are included in this collection.

Mort[13] reports a case of gangrenous appendix with coprolith, abscess, and septic peritonitis, with complete rupture of the intestines, followed by recovery. Analyzing this and similar cases seen in the Edmonton Infirmary, Glasgow, he concludes that volvulus may occur from appendicular adhesions, having operated on two such cases. He believes adhesions to be a very common cause of volvulus, as they bring two coils of intestines together, and thus form a band or pedicle for rotation, converting an undulating or sinuous loop of intestine into one with a sharp U-shaped curve.

Braham[14] reports the use of the patient's own appendix as a living graft to restore a damaged urethra following traumatic rupture of the perineum and extensive loss of the urethral canal. He concludes from his own experience and that of Axhausen that success in these cases is largely due to autoplasty as opposed to homoplasty or heteroplasty grafting.

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ARTERIAL PRESSURE. *Carey Coombs, M.D., M.R.C.P.*

Sphygmomanometric Methods.—Oliver[1] describes a pocket mercurial manometer which he uses, measuring only 9½ in. in length, 1½ in. in breadth, and ⅞ in. in thickness. Full details are given in the original article. The same writer gives some account of plans for avoiding the discomfort which the armlet causes in some people, and which he ascribes to the bursting sensation caused by venous stasis in the arm compressed. To avoid this, quick filling of the armlet bag is advisable. Of the methods proposed, the following is the simpler : " The filler is furnished with a tap which, after the requisite degree of air pressure has been secured, is turned, and thus shuts off the filler securely, and enables us to compress and close the artery without leakage from a faulty valve."

The instrument is then filled up to 100 mm. Hg, and the tap of the filler is turned. The right hand is then placed over the air-bag of the armlet, and compressed to the required reading of the systolic pressure.

Oliver is among the advocates of the *auditory* as opposed to the tactile method of observing the manometric movements. He holds that it provides the most satisfactory means of reading both systolic and diastolic pressure. Warfield[2] and Macwilliam and Melvin[3] also recommend this method, especially from the point of view of securing accurate readings of the diastolic pressure. Of the actual technique the latter writes as follows:—

" After an extended trial of various apparatus, we use for routine examination an ordinary armlet (12 cm. broad) applied to the upper arm (not the forearm) and inflated by an ordinary ball filler, a mercury manometer (for example, Martin's form) to measure the armlet pressure, and an auditory tambour or phonendoscope (for example, Oliver's) to auscultate the artery. This very sensitive tambour, strapped on the arm on the distal side of the armlet, has the great advantage, as compared with an ordinary binaural stethoscope or an ordinary phonendoscope, of leaving the hands of the observer free. The tambour must be placed over the artery at the bend of the elbow close to the distal side of the armlet, and must be kept applied to the skin without exerting any appreciable pressure. It has, of course, long been a familiar fact that strong pressure applied to an artery by the end of a stethoscope causes production of sound in the vessel, the sound produced being commonly described as a murmur. Very considerable pressure with the tambour is needed to elicit sounds in this way. With any reasonable care in the application of the tambour there is no danger of fallacy from this cause in the use of the auditory method. In making an estimation the armlet pressure is first raised well above systolic pressure, as indicated by the disappear-

ance of the pulse, tested by the ordinary tactile method. When this is done, no sound is heard over the brachial artery at the elbow. The armlet pressure is then gradually lowered, and as soon as this pressure fails to keep the artery obliterated and blood begins to force its way beneath the armlet at each heart beat, a sound is heard in the form of a distinct thud. The beginning of this sound serves as the index of systolic pressure, affording a very sharp and precise indication. With a finger on the artery it is recognized that the beginning of this sound comes at least as early as the reappearance of the pulse tested by the tactile method; indeed, the former is usually a few millimetres above the latter—for example, 5 to 10 mm. The commencement of the sound is in no case below the tactile indication when the auditory method is working properly. The armlet pressure being gradually lowered, the sound becomes louder, and may develop

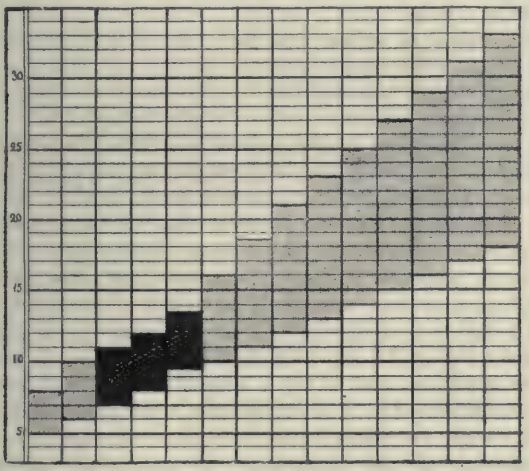

Fig. 5.—Table of corresponding maximal (systolic) and minimal (diastolic) pressures, as observed in the brachial artery by the Pachon-Lian apparatus. The black areas represent the pressure observed in healthy adults.

a murmurish quality, as Oliver describes it. At a lower level it diminishes in intensity, at one point rather suddenly becoming weaker, and at the same time changing in character from a clear to a duller sound. This change in intensity and character may be followed (1) very speedily by extinction of the sound, or (2) on the other hand, by persistence of the sound through a very considerable range of further lowering of the armlet pressure (for example, 20 to 30 mm., etc.). The weakening and dulling of the sound we regard as the index of diastolic pressure."

Nicholson[4] also points out the value of this method, and describes an instrument which is easily portable.

Lian[5] furnishes a long and elaborate argument for the observation

of the minimal (diastolic) as well as the maximal (systolic) tension. He applies the data thus secured (*Fig.* 5) to diagnosis and prognosis in the following manner :—

1. Systolic and diastolic tension are both raised. Such a formula enables the observer to set aside the possibility of aortic insufficiency, and if the rise in diastolic tension amount to 40 mm. Hg, it is almost certain that the kidneys are diseased. If the diastolic rise be proportionately greater than the systolic, it points to some degree of cardiac inadequacy induced by the high pressure ; if the rise in diastolic pressure is relatively less than in systolic, it shows that the hypertrophied left ventricle is proving equal to its task. In any case of high systolic pressure, a rise of 35 to 50 mm. Hg in the diastolic reading (i.e., to 130 to 145 mm. Hg) is of grave import.

2. Systolic tension is raised, while diastolic remains normal. Such a formula is in favour of a diagnosis of aortic insufficiency, but much more definitely ; so is

3. A combination of raised systolic with lowered diastolic pressure. The same diagnosis is suggested by

4. Lowering of the diastolic out of proportion to the lowering of the systolic pressure ; and

5. By a low diastolic coincident with a normal systolic pressure. As to variations in the diastolic pressure, a fall in it in a case of hypertension is a good sign, and its rise is a bad sign.

Barach[6] proposes to use the systolic and diastolic pressures, with the pulse-rate, as a basis for determining the cardiac efficiency. He multiplies both pressures by the pulse-rate, and adds them together to find what he calls the ' energy index ' of the circulating apparatus. Thus, a man with a systolic pressure of 120 mm. Hg, a diastolic pressure of 70 mm. Hg, and a pulse of 72 per minute, has an energy index of $120 \times 72 = 8640$, $+ 70 \times 72 = 5040 = 13{,}680$ mm. Hg. According to his calculations the highest normal index is about 20,000. The highest indices are, of course, found in cases of renal hypertension.

Stone,[7] writing of the importance of estimating the diastolic as well as the systolic pressure, declares in favour of the auscultatory method, pointing out that it gives a slightly higher reading than the palpatory estimation. According to him, a high diastolic pressure (sustained at 100 mm. Hg or higher) is a better index of hypertension than raised systolic pressure. He speaks of the fraction $\frac{\text{systolic} - \text{diastolic} = \text{pulse pressure}}{\text{diastolic pressure}}$ as representing the myocardial burden or load. Normally, the pulse pressure is about 50 per cent of the diastolic pressure ; when it rises above this proportion, a condition which he designates ' cardiac overload ' is present, in which the heart's task is excessive. When overload rises to the point at which the pulse pressure is equal to the diastolic pressure, the patient is immediately threatened with cardiac failure. [It is clear from these and other observations of a similar kind, that there is not yet any general agreement as to the relative importance of the systolic and

the diastolic pressures, nor any formula for the discovery of the absolute efficiency of the heart which is acceptable to every one.—C. C.]

Prognosis.—As Edgecombe[8] points out, there is a functional or neurotic type of hypertension, commoner in women than in men, and distinguishable from the organic type by the absence of cardiac hypertrophy and arterial thickening. In persons of an excitable temperament the mere sight of the sphygmomanometer sends the pressure up a little, but Edgecombe thinks there is something more than this, possibly an arterial spasm, which is in part at any rate responsible for the rise. In such patients, the high reading has no serious prognostic significance. Further, before assuming that a high pressure is of grave import, it is necessary to discover by repeated observation whether it is permanent or merely transitory. Finally, when the rise in tension is persistent and associated with organic disease, life may be prolonged for many years, even though the patient undergo no active treatment. He gives an excellent summary of points to be noted in forming a prognosis in any given case. The younger the patient the worse the outlook, other things being equal. Very high pressures are absolutely bad, but medium-high (say 170 to 200 mm. Hg systolic) have to be considered merely as one feature of the circulation's work. The fact that the palpable superficial arteries are obviously diseased does not prove that the visceral vessels are equally damaged, and it is these last that matter most. A rapid pulse is not a good sign in cases of hypertension.

Lichty[9] uses a description of six cases observed for long periods as a text for the lesson that high tension alone, unaccompanied by other unfavourable symptoms, does not warrant a bad prognosis, even if it resists therapeutic efforts directed towards its reduction.

Treatment.—Both Edgecombe and Lichty insist on two points: first, that it does the patient harm to let him know too much about his pressure; and second, that in many cases treatment is unnecessary and therefore futile. There are persons whose visceral blood-supply depends on maintenance of high pressure, and if treatment were to succeed in a reduction of tension, the heart and other organs would deteriorate and fail. Happily, in such cases, even the most strenuous efforts fail as a rule to affect the pressure much. Conversely, treatment is indicated which actually maintains high pressure by keeping up the work of the heart at an efficient pitch where cardiac failure threatens.

Lichty has found **Alkalies** of service in keeping down pressure where this is needful, and he also thinks help may be gained from treatment based on the intestinal auto-intoxication hypothesis of high pressure. Among the intestinal antiseptics that are used in this connection, Brasher[10] quotes **Kerol** as having been of value in his hands. It is given in 3-min. capsules. Piersol[11] also lays stress on the importance of searching for and removing chronic infective foci, not only in the gall-bladder, appendix, and other parts of the alimen-

tary tract, but also in other organs, e.g., the nasal sinuses, the pelvic viscera of women, and so on, the presumption being that such foci pour out pressor toxins into the system, and thus provoke and maintain a heightened pressure. He found that in only fourteen of the fifty cases analyzed was treatment successful in actually bringing the pressure down, but he claims that generally hygienic treatment was nevertheless instrumental in securing physical comfort, and prolonged life in a majority. Humphris,[12] in an article which must be consulted for details, recommends **D'Arsonvalization** as a means of reducing tension; also the **Electric-light Cabinet** when there is an associated nephritis.

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ARTERIES, SURGERY OF. (*See also* AMPUTATIONS, *and* GANGRENE.)

F. W. Goyder, F.R.C.S.

Sherrill[1] reports a case in which he successfully sutured the brachial artery by Carrel's method three hours after rupture due to backward dislocation at the elbow joint. At the operation the divided ends of the brachial artery stood out prominently in the wound; both were filled with blood-clot, no fresh blood being present. A small amount of clot was found among the torn muscles. Within five minutes of suturing, the circulation returned in the hand, though no radial pulse could be detected. Ultimately the radial pulse became as good as on the sound side.

Goodman[2] records the results of fifteen cases of *arteriovenous anastomosis* of the femoral vessels for impending gangrene. His results uphold the possibility of reversal of the circulation in an extremity, a possibility which Coenen and Wiewerowski deny. Angiosclerosis and arterial thrombus are indications; advanced sepsis and fulminating gangrene are contra-indications. The best time is before gangrene has set in; if this has already occurred, operation in non-septic cases may improve the nutrition of the limb to such a degree that, although amputation is necessary, much tissue may be saved. He advises end-to-end anastomosis. The utmost delicacy and skill is necessary to avoid post-operative thrombosis. Of the fifteen cases, six were successful. Several which promised success required amputation later, but had temporary relief from pain. There were thirteen end-to-end anastomoses, one side to side, and in two, advanced thrombosis showed that anastomosis was not warranted. In two with gangrene, a low amputation was satisfactory. Of eight failures with one death, three should not have been operated on because of spreading gangrene.

A paper on *pulmonary embolism*[3] by a former assistant of Ulrichs analyzes 22 cases of sudden death due presumably to this condition.

With regard to the possibility of performing Trendelenburg's operation, it was found that: (1) Even with the most careful observation it was not possible to recognize the condition with absolute certainty; (2) In one-fourth of the fatal cases death was immediate; more often it ensued in ten or more minutes; (3) One-third of the patients were so old or weak that operation would have been hopeless; (4) In only 5 out of 16 cases did post-mortem examination show that operation would have been technically possible; of these, 3 died immediately, or were so weak that they were unfit for operation; (5) Hence the prospects of success from operation are very small; (6) Two cases, both severe, of what could not be distinguished from typical pulmonary embolus, recovered without operation; in view of this a decision as to the necessity of operation is made more difficult.

The author concludes that if favourable conditions occur, and if the previous history has also been satisfactory, operation might be successfully performed, and an attempt would be justifiable in view of the practical certainty of death if the condition was unrelieved.

Bauer[4] reports a recovery after operation for *embolism of the abdominal aorta*. A patient, age 39, the subject of mitral stenosis and incompetence due to rheumatism, was seized with sudden pain in both legs, which became blue, cold, and immobile. The pulse in both disappeared. Cyanosis of the face developed, and coldness; lividity and 'marbling' of skin reached to the umbilicus. After stimulation by camphor and digalen, the abdomen was opened under ether, the intestines were displaced, and the peritoneum above the bifurcation of the aorta was incised to the left of the mesenteric vein. Three cm. above the bifurcation the pulse could be felt, and digital compression was applied above this. A longitudinal incision 2 cm. in length was made through the aortic wall, the clot extracted with forceps, and the aorta closed with four sutures of plaited silk No. 0, using surgical needles with spring eye No. 7. Two Carrel sutures were also used. After a short light compression of the suture line, hæmostasis was perfect, and pulsation returned to the limbs. The operation lasted an hour and forty minutes. The clot was 4 cm. in length, and looked like a large tooth with two roots. It had a kernel the size of a hazel nut, grey in colour and fairly firm, evidently the embolus itself surrounded by coagulated blood. The symptoms vanished immediately except for pain in the left foot and calf. The patient was discharged as cured on the twenty-fifth day.

Gordon Watson,[5] discussing *post-operative embolism of the femoral artery*, and methods of treatment, says: "There are two important factors to consider: the condition of the lining of the vessels, and the length of time that the vessel has been occluded. If the patient is old and suffering from arteriosclerosis, subsequent thrombosis is likely to occur, even if an embolus is successfully removed, and consequently pétrissage should offer more chance of success, even though resulting in the blockage of vessels lower down. In these cases imme-

diate massage of the affected part should first be tried, and, if unsuccessful, the artery should be exposed and an attempt made to dislodge the embolus by pétrissage. In the case of a healthy patient under middle age, with healthy vessels, arteriotomy conducted on careful lines should be the method of choice. A proximal clot rapidly forms as far as the nearest branch. This fact must not be forgotten in operative procedures. The lodgement of an embolus in an artery is rapidly followed by thrombosis, the extent of which will depend on the condition of the heart and arteries and on the size of the vessel. Consequently, the earlier the attempt at embolectomy, the greater the likelihood of success. At the same time, massage is less likely to succeed, once thrombosis has become established. Cases have been recorded in which an embolus has been dislodged spontaneously. In one an embolus was first arrested at the bifurcation of the aorta, producing paraplegia. On the next day it had reached the external iliac artery of one side, bringing relief to the opposite limb. On the third day the embolus descended to the popliteal."

Unger[6] relates three operations for *aneurysm*. In one case, a popliteal aneurysm had developed fourteen days after a kick. While preparing to apply a tampon the aneurysm burst. The femoral artery in its lower third was exposed and clamped. The aneurysmal sac was then extirpated, when a gap of 15 cm. remained between the ends. The popliteal vein, previously tense, collapsed, and a lateral tear in it was closed by suture. Fifteen cm. of the saphenous vein were next excised, and the distal end united to the proximal arterial stump in the adductor canal ; the other end was drawn through into the popliteal space, and united to the lumina of the anterior and posterior tibial arteries by Carrel's method. After removal of the clamp the foot became rosy red and pulsation returned. Blueness appeared again almost at once because of thrombosis at the upper end. The femoral artery was then opened in the middle of Hunter's canal, and the clot removed with forceps. Five months later the transplant had remained pervious.

In a second case of traumatic aneurysm due to a pistol shot in the groin of a man, age 25, the femoral artery 6 cm. below Poupart's ligament became embedded in thick tissue full of veins. Much bleeding occurred during manipulation from vessels opening into the mass. A clamp on the femoral artery controlled it. The artery below the vascular mass had also to be clamped. The deep femoral artery was ligatured. The femoral vein also communicated with the aneurysm ; clamps at each end did not control the bleeding owing to a deep branch which also had to be ligatured. An irregular defect 2 cm. long remained in the vein. This was closed by lateral sutures narrowing the lumen. A 10-cm. gap between the arterial ends was bridged with a portion of the saphena vein. Full recovery ensued, and the patient was able to return to his ordinary work.

A syphilitic patient, age 50, was suddenly seized with pain in his foot, the skin becoming blue. Aneurysm of the popliteal artery

was found ; a clot appeared to have blocked the outlet. The sac was extirpated, leaving a 10-cm. gap. The vessel walls were so brittle that they were unsuitable for suturing ; in addition, the lumen of the saphena was so small that a junction could not be effected. Amputation had to be performed.

These cases show the difficulties that have to be surmounted in vessel anastomosis and in operations for aneurysm.

Makins,[7] in his Bradshaw Lecture, summarizes the treatment to be adopted in the case of *gunshot injuries of the arteries in war*. It must be remembered that the more complicated operations can be carried out only at the base hospitals ; hence one must determine what, if any, form of operation is most suitable under the circumstances.

1. *Primary Operations*.—The operation of choice for primary hæmorrhage from a gunshot wound in the field is direct ligature. In support of this opinion may be advanced its comparative simplicity, and its applicability even under adverse conditions. Primary ligature should be confined to cases in which hæmorrhage is obviously endangering life.

2. *Intermediate Operations*.—The wounds are ill-suited to any form of treatment except the simplest. The evacuation of clot is difficult ; the stiff œdema of the arterial wall, as well as that of the boundaries of the cavity, and the probable necessity of providing drainage, negative the chances of a successful suture, and render the prognosis even of a simple direct suture doubtful. The experience of recent campaigns has been to show that in the absence of secondary hæmorrhage, or rapid extension of the hæmatoma, the general tendency is towards contraction and localization of the extravasated blood, and to diminution in the size of the arterial wound, while the conditions improve for the successful application of treatment. Proximal ligation at the seat of election is unsafe, not only from the risk of further secondary hæmorrhage, but, since the conditions for the establishment of a collateral circulation are bad, gangrene is frequent. A surgeon in the Manchurian campaign saw cerebral softening follow three times consecutively after ligaturing the common carotid in healthy young soldiers.

3. *Secondary operations* may be undertaken at an average period of about four weeks, and practically resolve themselves into operations for aneurysm. Simple proximal ligature is satisfactory for traumatic arterial aneurysms. For arteriovenous as for arterial aneurysms, proximal and distal ligature of the artery is suitable. Unless the vein is also tied on both sides, the thrill of the varix will continue. There is no disadvantage in doing it. For large arterial hæmatomata, opening of the sac, and ligature without removal of the sac, is of value. It is better in military surgery than extirpation of the sac, unless this is very small. Suture of the wounded vessel, with or without extirpation of the sac, obviates the risk of irrevocable damage to the brain in certain situations. Practically, in military surgery its use is bound to be limited. A consideration of the

wounds of arteries by bullets of small calibre, and their treatment. shows that progress in this branch of military surgery has taken the direction of increased conservatism and expectancy.

Laurent's[8] views agree very closely with those just quoted. He says that all wounds in warfare must be regarded as infected. This is true even when the wound is healed, especially where there is a large amount of blood-clot, as in diffuse aneurysm. At close range, explosive phenomena are most frequent ; lateral wounds, perforation, and complete section of vessels occur ; at long range, contusions are the rule. These, in the case of vessels, may give rise to aneurysm later. Shrapnel is an infrequent cause. After injury to a vessel, the limb must be treated as if it were fractured, and completely immobilized. The greatest care must be taken to avoid infection. Operations on the field must be limited to arrest of hæmorrhage ; ligature of vessels is unavoidable at times as an emergency measure. As far as possible, operation must be postponed till the patient reaches the base. Severe pain, threatened rupture, or erosion, may necessitate operation in arterial aneurysm. Apart from emergency, one should wait some weeks to favour the development of collateral circulation, and to disperse the last traces of irritation, or of infection, which often lies latent, ready to spread at the first favourable opportunity. Diffuse traumatic aneurysm may require immediate treatment. Arteriovenous aneurysm is not in urgent need of operation. Ligature of a vessel in the first forty-eight hours is easy, but is inadvisable except in emergency. Up to twenty-one days after injury the conditions are unfavourable for ligature. After this the operation is relatively safe. (*See also special section on* NAVAL AND MILITARY SURGERY.)

That *spontaneous cure of arteriovenous aneurysm* may occasionally take place is shown by a case of thirty years' duration, observed for twenty years by Osler.[9] A diagnosis of arteriovenous aneurysm of axillary vessels was made in 1888. A post-mortem made in 1909 showed that the axillary artery between the acromiothoracic and the internal mammary was dilated and somewhat fusiform, with greatly thickened walls. The axillary vein was also greatly enlarged, with thickened walls. No communication could be found between the dilated walls, although the classical signs had been observed during life on many occasions up to as late as 1900. Possibly the orifice of the communication gradually closed.

Coenen[10] describes a useful method of discovering whether it is safe to ligature the main vessel above and below an aneurysmal sac, or whether arterial reconstruction must be employed to prevent gangrene. The method has the advantage of being applicable at the time of operation. A ligature is applied to the artery above and below the aneurysm. A clamp is then applied below the distal ligature and the artery divided between. The clamp is then relaxed. Supposing there is no thrombus in the distal portion of the vessel, if this bleeds it may be taken as a sign that the collateral circulation is sufficient to prevent gangrene, the distal end of the vessel may be

tied, and the aneurysmal sac extirpated if desirable. If no bleeding occurs from the vessel, arterial suture has to be performed, the gap being bridged if necessary by saphenous implantation. The method is valuable in warfare, as it is applicable not only to stationary but to recent and traumatic aneurysms. Since adopting this method the author has been successful in all his traumatic cases, including five operated on up to five months after the injury and three in the early stage. Two saphenous implantations were necessary. (*See also* AMPUTATIONS.)

The following cases illustrate the possibilities of modern vessel surgery. Kümmel[11] had a 52-year-old patient suffering from ruptured aneurysm of the aorta, who was getting weaker, and death from hæmorrhage was certain, so that operation was performed. The fourth to the sixth ribs were resected at the spinal column, and an opening was made in the thorax large enough to insert the hand. The pleura was pushed forward, and the thoracic aorta laid bare without difficulty as far as the sac of the aneurysm, which lay above the diaphragm. The aorta was compressed at the diaphragm between the thumb and index finger of an assistant, and the upper boundary of the pulsating tumour and the sac of the aneurysm laid bare, the tear already present enlarged, and masses of clot were removed. The diaphragm was split, and the upper part of the abdominal aorta exposed behind the peritoneum, providing a free view of the thoracic and abdominal aorta and the sac of the aneurysm, which was larger than the fist. The original tear in this was 10 cm. long. The part of the artery behind the spine was comparatively unaffected. The sac was trimmed so that the vessel corresponded to the normal size of the aorta. The slit was closed with a continuous suture. A second continuous suture was applied without any difficulty over the first. The digital compression of the aorta was gradually relaxed, and finally withdrawn altogether ; the suture was found to be sufficient. The pulsation in both femorals was strong, and the pulse could be felt in the dorsalis pedis. The operation lasted about an hour, and after its completion the patient was in comparatively good condition ; intravenous ether was used, and the heart was kept strong by the continuous influx of salt solution and ether. But he gradually grew weaker, and finally died of heart failure. Kümmel recommends that the line of suture should be covered with a broad strip of fascia.

Halsted[12] describes the removal of an iliofemoral aneurysm three weeks after preliminary partial occlusion of the external iliac artery. The vessel was freed with blunt dissectors, and lifted from its bed with two tapes, between which an aluminium band was curled about it. With the thumb and finger the band was rolled (tightened) until a thrill could be distinctly felt in the artery below it. The band was again rolled, tight enough this time to obliterate the thrill in the artery and the pulsation in the aneurysm. A very faint pulse could still be felt between the band and the aneurysm. Thus the vessel had been occluded to precisely the desired amount. The foot imme-

diately became quite cold. Had the artery been totally occluded, gangrene might have resulted. The thrill indicates accurately the degree of constriction. Three weeks later there was faint pulsation in the aneurysm, and it was excised. Before resorting to temporary occlusion of the iliac artery an attempt was made to enucleate the sac partially. This being done, the common iliac was compressed. The aneurysm was found to terminate below in a broad funnel, from the inner and posterior side of which a large artery, presumably the profunda, was given off. Just below the funnel-shaped dilatation of the femoral, this artery was divided between two ligatures, and the sac dissected out from below upward. The external iliac artery plunged abruptly, without change in its size, into the sac at the upper part of its posterior surface. The aneurysm was then split longitudinally from one end to the other and the clots rapidly evacuated. The wall was perfectly dry, no bleeding points being seen. The sac was found to extend deeply into the pelvis. It had undoubtedly pressed on the internal iliac vessels and their branches. The further liberation of the sac was easily carried out. The common femoral vein was divided during the operation. Nine days later the patient was walking. Six months later there was no loss of power or sensation in the limb, and no swelling. He was able to do a full day's work without unusual fatigue.

Seifert[13] has operated for *arteriovenous aneurysm of the deep epigastric artery and vein*. A right rectus incision was made. The sac between the vessels was the size of a goose's egg ; the vessels above and below were dilated. The entire mass was about seven inches long. Double ligatures were applied to the vessels above and below, and the mass was extirpated ; a number of minor vessels had to be tied before the bleeding was controlled. Following this, the appendix, the right ovary and tube, and a mass of varicose veins in the right broad ligament was excised. The appendix was inflamed, and intimately adherent to the right ovary and tube ; there were inflammatory bands almost completely encircling the caput cæcum. The patient made an uneventful recovery, and has been in excellent health ever since, now a little over three years. This case is interesting and instructive on account of the uncommon location of the aneurysm, and its occurrence in a woman without a history of traumatism other than that pertaining to instrumental delivery while in labour. Trauma incidental to pressure on the abdomen during instrumental delivery, followed by puerperal infection, may have been the cause. Diseased vessel walls through which infected blood may have extravasated, forming an infective clot, and then ulcerated into the vein, or an infected embolus or thrombus ulcerating through the original vessel into another, are other possibilities.

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ARTERIOSCLEROSIS. *Carey Coombs, M.D., M.R.C.P.*

Etiology. — Schmiedl's[1] experimental raising of intra-arterial pressure by mechanical means produced no arterial lesions. This he regards as evidence in disproof of the theory that attributes arteriosclerosis to the mechanical effect of high arterial tension.

Treatment.—Schwalbe[2] has collected a series of authoritative opinions as to the value of the **Iodine** treatment of arteriosclerosis. The replies to his questions disclosed wide differences of opinion, some attributing great virtue to iodides even in non-syphilitic cases, others denying that they exert any action except when there is a syphilitic element in the causation.

Testi-iodyl is said to be a suitable vehicle for iodine (*p.* 34), and **x rays** useful in diagnosis (*p.* 59).

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ASCITES, SURGICAL TREATMENT OF.

E. Wyllys Andrews, M.D. (Chicago).

McDill[1] advises drainage by lymphangioplasty through a trocar wound. After a study of the various methods that have been proposed, he made experiments upon rabbits, which proved that the normal peritoneum could be drained into the surrounding tissues by woven silk gum tubing, rubber finger cots, or folded gutta-percha tissue. It was found that the free ends of the silk left in the cavity caused the accident of strangulation of the intestine in two cases. However, if properly placed, silk strands can be introduced through a trocar with a bodkin, and prolonged drainage secured thereby. The strands of silk produce what he calls a permanent connective-tissue peg, the breach made allowing the permanent escape of fluid and the danger of hernia being *nil*.

Nash[2] reports cases of ascites treated by paracentesis, omentopexy, and femoral drainage. He found that a bone bobbin inserted in the right femoral canal through an opening in the mid-line of the abdomen formed an effectual permanent drain, the ascites disappearing and no trace of the bobbin being left. In both his cases there was alcoholic cirrhosis.

Andrews reports two cases of chylous ascites, both due to carcinoma in or near the head of the pancreas, obstructing the thoracic duct. Repeated tapping removed several gallons at each sitting of milky, chylous, ascitic fluid.

References.—[1]*Surg. Gyn. and Obst.* 1913, ii, 523; [2]*Lancet*, 1913, ii, 1381.

ASTHMA. *J. J. Perkins, M.B., F.R.C.P.*

Treatment.—Crookshank[1] has found that good results follow the use of **Pituitary Substance** in cases of asthma, two-grain tablets being given night and morning. Twenty cases, which have been so treated

by him with benefit, were chosen as having suffered for years in spite of other drugs.

The importance of protecting the asthmatic from recurrent attacks of bronchitis is insisted upon by Fussell,[2] who has noticed that in all cases in which spasmodic asthma has lasted for some time, the attacks are precipitated by bronchitis. **Climate** is therefore an important factor in the treatment of the asthmatic, together with the avoidance of overheated, ill-ventilated rooms, while common colds or influenza should be promptly dealt with. The drug treatment advised proceeds on ordinary lines ; it may be noted that Fussell has had good results from **Adrenalin,** though he has not found it so certain in its action as **Morphia** (*see also p.* 1) ; between the attacks he always gives **Potassium Iodide,** but has not found it the specific some affirm it to be.

Use of atropine-sulphuric acid recommended (*p.* 3).

REFERENCES.—[1]*Lancet*, 1914, i, 747 ; [2]*Ther. Gaz.* 1913, 544.

ATAXIA, TREATMENT OF. (*See* SYPHILIS, CEREBROSPINAL.)

AURICULAR FIBRILLATION. *Carey Coombs, M.D., M.R.C.P.*

Armstrong[1] records a remarkable case in which a man, wounded in the chest by a revolver bullet, developed the total arrhythmia which is characteristic of auricular fibrillation. Graphic records showed all the features associated with this form of cardiac failure. The bullet, which lay within the pericardial sac, directly behind the heart, was successfully removed. Within three hours after the operation the pulse had become regular, and it remained so.

James and Hart[2] emphasize two important aspects of the totally irregular pulse of auricular fibrillation. The pulse at the wrist does not give an accurate idea of the rate at which the heart is beating, for many of the cardiac contractions are so feeble that the resulting pulse waves fail to reach the wrist. The heart may be beating over 100 times per minute, and yet the pulse as counted at the wrist may not exceed 70 per minute. The difference between the two counts is termed the pulse deficit. Under treatment, this deficit should undergo progressive reduction, and its behaviour is therefore a very useful guide both in prognosis and treatment. Secondly, they insist on the fallacious nature of blood-pressure measurements for the same reason ; there are a great many feeble beats whose systolic pressure is far below that of the stronger beats, and when the pressure is measured in the ordinary way, by observing the point at which the systolic pressure is completely overcome by the pressure in the manometer armlet, it is only the pressure of the maximal beats that is registered. To obviate this fallacy, they recommend observation of what they call the average pressure. The number of beats that escape the armlet, distended to different pressures, is counted, and an average pressure arrived at by adding together the total pressures in the beats observed, and dividing them by the number

of beats observed. The following example will serve as an illustration of the method :—

Brachial pressure.		Radial count.	
100 mm.	..	0	
90 mm.	..	13	$13 \times 90 = 1170$
80 mm.	..	$47 - 13 = 34$	$\times 80 = 2720$
70 mm.	..	$75 - 47 = 28$	$\times 70 = 1960$
60 mm.	..	$82 - 75 = 7$	$\times 60 = 420$
50 mm.	..	$101 - 82 = 19$	$\times 50 = 950$
			Apex = 131)7220
			Average systolic blood-pressure 55 +

James and Hart find that the arterial pressure as measured by this method rises under the influence of **Digitalis,** which is so beneficial in these cases that most authorities concur in regarding the totally irregular pulse of auricular fibrillation as the supreme indication for its exhibition.

REFERENCES.—[1]*Ann. Surg.* 1914, i, 852 ; [2]*Amer. Jour. Med. Sci.* 1914, i, 63.

AURICULAR FLUTTER.

(*Vol.* 1914, *p.* 131)—A complete account of this syndrome is given at the above reference. Some relief is to be expected from the administration of Digitalis or its congeners.

BANTI'S DISEASE. (*See also* SPLENOMEGALY.)

Herbert French, M.D., F.R.C.P.

The nature of chronic splenic anæmia and its relationship to Banti's disease have been under much discussion during the last twelve months. Rolleston[1] says that chronic splenic anæmia presents the following characters : (1) Chronic splenomegaly which cannot be correlated with any recognized cause ; (2) Absence of enlargement of the lymphatic glands ; (3) Chlorotic anæmia, with a low colour-index ; (4) Absence of leucocytosis, and usually presence of leucopenia ; (5) Liability to copious gastro-intestinal hæmorrhages from time to time ; (6) A prolonged course without any tendency to spontaneous cure, though splenectomy (if successful) is usually curative.

PATHOLOGY.—The title 'Banti's disease' is now often used as synonymous with splenic anæmia, even by those who fully recognize that it is a sequel or terminal stage of splenic anæmia, and does not occur in all cases, even when unduly prolonged. Rolleston, however, confines his remarks on splenic anæmia to cases in which there is no reason to believe that the liver has become cirrhotic. After the rigid exclusion of all the conditions which may imitate chronic splenic anæmia, the remaining cases may still further be divided into : (1) Those which show splenic fibrosis and *fibro-adenie*, and will eventually be complicated by hepatic cirrhosis, or the third stage of Banti's disease ; and (2) Those in which the spleen does not show these changes, and in which hepatic fibrosis does not occur even after many years. Cases which have lasted considerably longer than the first and second

stages of Banti's disease (five to seven years) have been recorded by several authors. Banti himself recorded a case of fourteen years' duration cured by splenectomy.

Since splenectomy cures the disease, it is clear that the spleen is in some way responsible, and there is not any active hæmic infection or intoxication at work ; and that splenic inadequacy is not the cause of the anæmia. With our present knowledge it seems most reasonable to believe : (1) That in splenic anæmia a chronic infective or toxic process has its headquarters in the spleen, which therefore undergoes fibrotic enlargement ; (2) That the large spleen mechanically causes gastric hæmorrhage, which is responsible for the anæmia ; and (3) That poisons conveyed from the spleen eventually induce cirrhosis of the liver.

Gibson[2] has made discoveries in connection with splenic anæmia which, if confirmed, will help to throw a great deal of new light upon the nature of certain cases of splenomegaly and Banti's disease. He has discovered in six separate cases of splenomegaly (three with a picture of Banti's disease, two with splenic enlargement and fibrosis, and one with simple splenomegaly) appearances in sections of the spleen, stained by special methods, which he is only able to interpret as being due to a parasitic infection of the organ by a streptothrix organism, and he believes that this must have been the causal factor of the malady. The stain employed was Wheal and Chown's method for staining the clubs in actinomyces, which, briefly, is a double stain, first by hæmatoxylin, then by carbol fuchsin, the decolorization being effected by equal parts of absolute alcohol and saturated watery picric acid. *Plate IV* illustrates the appearances he found.

Symptoms.—In a typical case these come on gradually, and are referable to anæmia, such as weakness, shortness of breath on exertion, and debility. Less frequently, the first thing mentioned is hæmatemesis. The cardinal features are splenomegaly, hæmorrhages and the blood changes. The *enlargement of the spleen* probably always precedes the anæmia, sometimes for long periods ; and the condition, if discovered in this early stage, appears to be one of simple splenomegaly. The enlargement, which is progressive, varies according to the duration of the disease ; it may be very considerable, but it seldom rivals that of myeloid leukæmia, and is much less than that seen in Gaucher's disease. The spleen feels firm and smooth, is not tender, and may present one or more notches. In a few instances a *bruit de diable* has been audible over it, doubtless owing to eddies produced by slight torsion of the dilated veins in the gastrosplenic omentum or of the splenic vein.

Gastro-intestinal hæmorrhage is the most serious symptom, and usually raises the question of splenectomy. It is characteristically recurrent, and may extend over many years. The intervals vary from weeks to many months or even years. The hæmorrhage may be enormous : in one of Osler's cases nearly three quarts of blood were lost in thirty-six hours. On the other hand, it seems probable, though not

PLATE IV.

BANTI'S DISEASE: APPEARANCES OF SPLEEN

Fig. A.

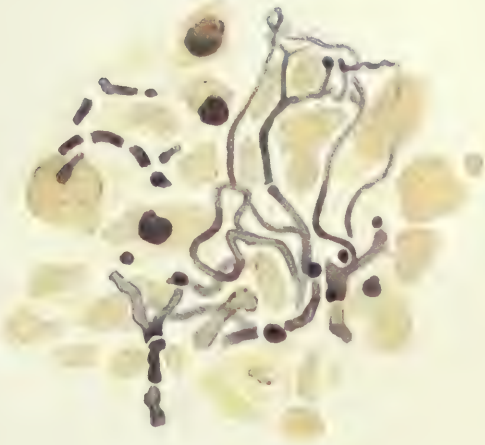


Fig. B.

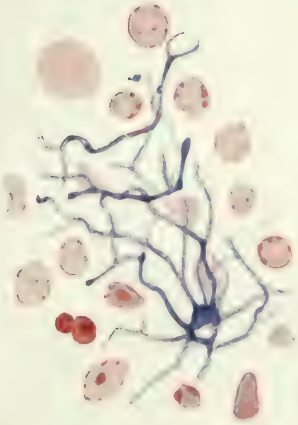


Fig. C.

Fig. A.—Showing the black threads under a high magnification. Notice the septa in some threads and the segmentation of others (Wheal and Chown's stain). *Fig. B.*—Showing a thicker branch-work (Wheal and Chown's method). *Fig. C.*—Showing the network stained by Gram's method (Claudius's modification). One club-shaped extremity is to be seen.

Illustrations kindly lent by "Quarterly Journal of Medicine."

proved, that minute quantities of 'occult blood' may be passed in the stools for long periods. The most obvious source of the gastric hæmorrhages is ulceration of œsophageal varices. General portal obstruction, as seen in cirrhosis, is absent, but there is local dilatation of the splenic and œsophageal veins and vasa brevia. The large size of these latter may be explained as a result of occasional torsion of the splenic vein. However, copious hæmatemesis is rare or absent in other and more extreme forms of splenic enlargement, which should equally cause torsion of the veins. In some cases, in which œsophageal varices are not forthcoming, small erosions of the mucosa, due to bacterial necrosis, may perhaps be responsible; clinically, this would seem probable when the onset of hæmatemesis is accompanied by fever. Epistaxis sometimes occurs, and in a few instances purpura has been noted. One case of hæmaturia has also been recorded.

There is *anæmia* of the chlorotic type, namely, with a low colour-index. The number of red blood corpuscles may drop below 2,000,000 per c.mm; but in Osler's fifteen cases the average was considerably higher, namely 3,425,000 per c.mm., and the hæmoglobin 47 per cent. But the estimations naturally vary widely in the same case at different times, according as there has or has not been recent hæmorrhage. The anæmia may be very well marked in cases without obvious hæmorrhages. It may be persistent, but usually it occurs in attacks, sometimes after a copious gastric hæmorrhage, sometimes without any such history. After a hæmorrhage, the condition of the blood usually improves, and may become normal; in some instances, indeed, the number of red blood corpuscles may be more than 5,000,000 per c.mm. The leucocytes are not increased in number, except as the result of a passing complication, and sometimes after a profuse hæmorrhage. The usual condition is a leucopenia, the cause of which is not known. In some cases there is a relative increase in the lymphocytes; but no stress can be laid on this. A few myelocytes may appear in the blood in the late stages.

There is no enlargement of the lymphatic glands, and the liver is not increased in size until the condition is complicated by hepatic changes (Banti's disease). Ascites has been reported in cases without cirrhosis of the liver, and is perhaps due to chronic perisplenitis. The urine is normal, though in the later stages it may be high-coloured. In some cases there are attacks of colicky pain, probably due to traction and slight torsion of the peritoneal ligaments of the spleen, or to dragging on perisplenitic adhesions. In other instances there is merely a feeling of weight or discomfort on the left side of the abdomen. Many, however, are so free from localizing symptoms that the splenomegaly is unsuspected until discovered on examination. Gastro-intestinal disturbance and indigestion are less frequent than might be expected as a result of the embarrassment due to the large spleen. Some patients suffer from diarrhœa; this, according to Banti, occurs in the transitional stage between splenic anæmia and Banti's disease. The skin is usually pale, but sometimes shows pigmentation, diffuse,

or localized, when it is confined to areas of pressure; conceivably irritation of the abdominal sympathetic by traction exerted by the enlarged spleen is responsible in some cases. It may be due to the medicinal use of arsenic, and this probably explained its occurrence on the abdomen only in one case which Rolleston saw. Slight jaundice is usually mentioned. The skin of the abdomen does not show dilated veins, as in the portal obstruction due to cirrhosis. Œdema of the feet has been observed in a few cases, and may be due to cardiac dilatation. Hæmic and apical systolic murmurs are not uncommon. Peripheral neuritis does not occur. As the disease is afebrile, fever should suggest some complication or another diagnosis.

Treatment.—**Splenectomy** appears to be the only form of treatment of real value, though extensive adhesions may make operation very difficult, and there is considerable risk of severe or even fatal post-operative hæmorrhage. Attempts have been made by Rodman and Willard[3] to reproduce the clinical picture of splenic anæmia in dogs and rabbits by the injection into the splenic vessels of aleuronat, upon the assumption that endophlebitis may be in some way the cause of the splenic abnormalities in this disease; their results, however, have not thrown much light upon the subject. They report favourably on the use of **Salvarsan** in certain cases, though the improvement that has resulted from this drug has seldom been more than temporary, and they advocate splenectomy as the ideal treatment in any case in which there is no reason to suppose that extensive perisplenic adhesions render the operation difficult or impossible. They advocate a J-shaped incision (see *Plates V–VIII*), which gives the best operative exposure, and lessens the dangers of post-operative hernia. They consider that splenectomy during the first and second stages gives far better results than any other form of treatment. Up to 1908 this procedure gave a mortality of 17 per cent, according to the reports of Simmonds and Torrance, who collected 35 cases with only 6 deaths. From 1908 to 1912 the results have been even more favourable: 47 cases have been reported by various authors in which splenectomy has been performed before the appearance of Banti's symptom-complex; of these, only 5, or 10 per cent, have died. It is impossible to state with absolute confidence that splenectomy gives a permanent cure; but at least it can be said that the majority of these cases have been followed for from one to nine years after operation, and a few have been under observation for twelve years, and in no case has there been a return of the previous symptoms.

References.—[1]*Pract.* 1914, i, 470; [2]*Quart. Jour. Med.* 1914, Jan., 153; [3]*Ann. Surg.* 1913, ii, 601.

BERI-BERI. *Sir Leonard Rogers, M.D., F.R.C.P.*

S. Shibayama[1] deals with the present state of the beri-beri question in Japan, where a commission to investigate the disease was appointed in 1908, after the war with Russia. After visiting the Dutch Indies and the Straits Settlements, they came to the conclusion that kakke

PLATE V.

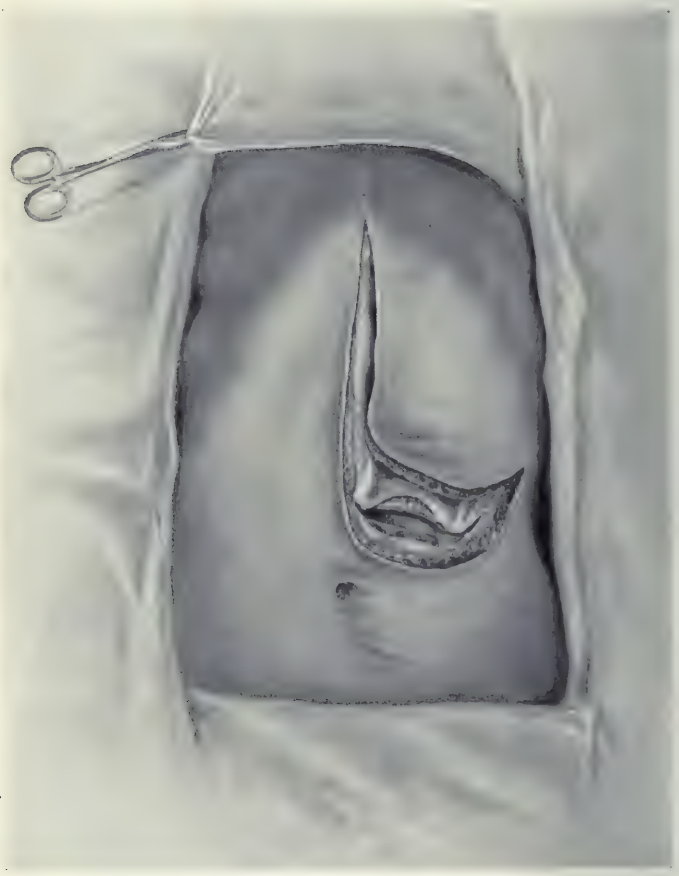
SPLENECTOMY: RODMAN AND WILLARD'S INCISION

The skin incision.

Plates V to VIII kindly lent by "Annals of Surgery."

PLATE VI.

SPLENECTOMY: RODMAN AND WILLARD'S INCISION—*continued*



The rectus muscle cut transversely.

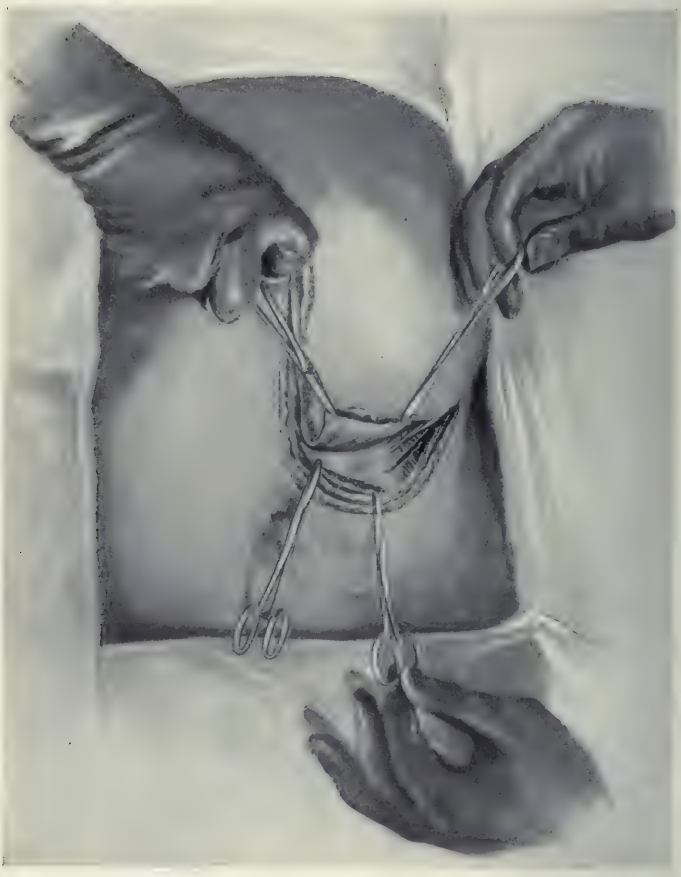
PLATE VII.

SPLENECTOMY: RODMAN AND WILLARD'S INCISION—*continued*

Separation of the fibres of the external oblique and transversalis muscles.

PLATE VIII.

SPLENECTOMY: RODMAN AND WILLARD'S INCISION—*continued*



The internal oblique muscle cut across.

of Japan is identical with beri-beri. Suzuki, the chemist of the commission, considers that the substance, the absence of which from polished white rice is the cause of the disease, is a material called 'aberic acid,' of which as small a dose as 0·005 mgram daily will protect a pigeon fed on white rice. Others hold the disease to be due to a ferment produced by the fermentation of white rice. Some workers deny that the disease seen in pigeons fed on white rice is the same as human beri-beri. In Japan, the epidemiology has been carefully studied in a number of recent outbreaks. The disease was found to have a seasonal prevalence, beginning in May and June, reaching its maximum from July to September, and disappearing when the cool autumn set in. It breaks out severely in one year, and is completely absent in another, without any change of diet. They have not yet been able to arrive at any conclusion. A one-sided diet cannot be assumed to be the cause of the disease, which rather appears to be an intoxication, possibly produced by some organism residing in the intestine.

H. Fraser and A. T. Stanton[2] return to the subject of unpolished rice as the preventive of beri-beri. An expedition into the interior of Dutch New Guinea has demonstrated the great value of unpolished rice in preventing the disease, no case having occurred among 204 rice-eaters. The difficulty now is to get unpolished rice prepared on a large scale commercially, as it is not a popular food. It is suggested that all Government institutions should insist on the use of unpolished rice, and thus create a demand for it. V. G. Heiser[3] records that after beri-beri had been banished from the Culion Gaol in the Philippine Islands by the prohibition of the use of polished rice, an outbreak followed the temporary use of such rice, which the Government had been forced to buy to break a ring who were forcing up the price of the commodity. Over one hundred cases occurred within four months, but rapidly declined when unpolished rice was again available. A very simple and practical test of the approximate degree of polishing is to ascertain the depth of the colour when the rice is stained with either Löffler's methylene blue or tincture of iodine, as a rice that stains only slightly contains more than the safe limit of 0·4 per cent. He advocates a tax on polished rice as the practical solution of the difficulty.

W. P. Chamberlain[4] also advocates the use of Gram's iodine solution for testing the degree of polishing a rice has undergone, as where the pericarp is intact it stains grey, while a highly milled rice is almost black throughout. If undermilled rice is prepared from kinds with a white pericarp it is not objectionable in appearance. W. J. J. Arnold,[5] as a result of his experience of ship beri-beri at St. Helena, believes that it is an infectious disease, and not due to deficiencies of diet. J. T. Clarke,[6] on the other hand, supports Braddon's rice theory, and quotes the good effect of parboiled unpolished rice in reducing from 32·1 to 6·7 per cent the death-rate of beri-beri in cases surviving seven days after admission to the Kuala Lumpur Hospital.

C. Wellman, A, C. Eustis, and L. C. Scott,[7] working on the lines of Funk, obtained a concentrated extract of rice polishings, which they injected intramuscularly in pigeons in whom beri-beri-like symptoms had been produced, and cured two out of seven when in the late convulsive stage. They have found subdural hæmatomas in this stage. E. B. Vedder[8] discusses several reported instances of beri-beri occurring among persons said to be fed on a satisfactory diet, and shows that the data recorded do not suffice to controvert the generally accepted dietetic theory. In the case of Lovelace's Brazil example (see MEDICAL ANNUAL, 1914), tinned vegetables and meat, in the sterilization of which vitamines are destroyed, and white flour, which does not contain them any more than polished rice, formed the main part of the diet. In Arnold's experience at St. Helena, compressed vegetables were used, while the diet was shown to be deficient by lime-juice being issued to supplement it. In American gaols the diet was not shown to be efficient to prevent beri-beri. He supports the proposal to put a tax on polished rice in tropical countries, where the poor population are dependent on a rice diet and beri-beri occurs. This would enable richer people, whose diet is not limited to rice, to use the elegant polished variety, but compel the poor to use one of greater nutritive value.

R. B. Gibson[9] has found that the addition of calcium lactate to a white-rice diet prolongs the period of development of neuritis. He has also found[10] that even as much as 20 c.c. daily of human milk failed to protect fowls against the disease.

REFERENCES.—[1]*Med. Press and Circ.* 1914, i, 119 ; [2]*Lancet*, 1914, i, 96 ; [3]*Med. Rec.* 1914, 116 ; [4]*N. Y. Med. Jour.* 1914, i, 263 ; [5]*Brit. Med. Jour.* 1914, i, 299 ; [6]*Ibid.* 118 ; [7]*Amer. Jour. Trop. Dis.* 1913, 295 ; [8]*Ibid.* 826 ; [9]*Jour. Phil. Med. Sci.* 1913, 351 ; [10]*Ibid.* 469.

BILIARY TRACT. (*See* ABDOMEN, SURGERY ; *also* GALL-BLADDER.)

BILHARZIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

Legrand[1] has performed high resection of the ano-sigmoid mucous membrane in the form of a very extensive Whitehead operation, for intestinal bilharziasis with extensive involvement of the rectal mucous membrane. The operation is a difficult one, and it is uncertain if all the diseased parts can be removed. It is too early to say what the ultimate results will be.

J. A. Ray[2] describes what he believes to be a new variety of bilharzia ovum and miracidium, which he found in the urine of a patient at Pretoria. It has no spine, being a perfect oval, and always contained a living miracidium. In stained specimens it is seen to have a papilla and split tail, which moves freely in all directions, and can be retracted within the body, while it is composed of four segments, and the head and neck can also be telescoped into the body.

REFERENCES.—[1]*Surg. Gyn. and Obst.* 1913, ii, 287 ; [2]*Pract.* 1913, ii, 580.

BLACKWATER FEVER. *Sir Leonard Rogers, M.D., F.R.C.P.*

Bruce-Porter[1] records a case of blackwater fever, which he treated successfully at King Edward VII's Hospital for Officers, by five **Intravenous Injections of Normal Saline,** 25 oz. at a time, in order to obtain free action of the kidneys and excretion of the toxins. **Morphia** was given to allay restlessness.

REFERENCE.—[1]*Pract.* 1914, i, 261.

BLADDER, DISEASES OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

The Localization of the Prostate and Prostatic Urethra and the Floor of the Bladder on the Radiographic Plate.—In their researches Pedersen and Darling[1] used an opaque catheter with a conical head and an olivary enlargement 1 cm. long placed 1 cm. from the conical end, with the eye of the catheter between the two. When the instrument was introduced into the bladder and then withdrawn, so that its eye was closed by the sphincter, the olivary thickening was about the mid-point of the prostatic urethra. The conical end would then lie on the bladder floor, and the sphincter vesicæ would lie between the two. The results showed that there was a group of cases with a high outlet of the bladder, and a group with a low one. The low group had the outlet just above the symphysis, "the neck crossed by the symphysis, and the prostatic gland extending about 3 cm. distally." The form of the bladder varied in different individuals under approximately similar conditions of distention. The main axis lies in the interspinous line. There may be lateral projection of wide extent even without extreme distention.

Ectopia of the Bladder.—Edmunds[2] holds that plastic operations designed merely to reconstruct the bladder are unsatisfactory, since at the very best they only afford partial relief, and **Transplantation of the Ureters** is preferable. Transplantation of the base of the bladder is better than the separate transplantation of the ureters, because it is easier to perform, and on theoretical grounds is less likely to lead to an ascending infection. This is done better by an intraperitoneal than by an extraperitoneal route, as the operation interferes less with the vascular supply of the bladder stump, and a mobile portion of the bowel can be used. Further, "inasmuch as most of these cases die of pelvic cellulitis, the wound should be left freely open." [The mortality of Maydl's operation varies from 5·5 per cent (Josséraud, 18 cases) to 26·7 per cent (Katz, 57 cases).—J. W. T. W.] If a hernia develops it can be dealt with later. The author describes a case operated on by Maydl's method.

Chronic Cystitis in Women.—G. G. Smith, of Boston,[3] holds that this is not an independent disease, but that there is always some additional factor, such as pyelitis, which keeps up the inflammation. Acute cystitis, he states, will be cured by a few days in bed, urinary antiseptics, and a few irrigations. When the inflammation persists, we must look for some other lesion in the kidney, ureter, or urethra, or in the mechanism by which the bladder should be emptied. He

collected the histories of 98 women with a diagnosis of cystitis, and found the cystitis was associated with non-tuberculous renal infection, 61 per cent ; renal tuberculosis, 19 per cent ; difficulty in emptying the bladder, 7 per cent ; systemic and pelvic infections, 7 per cent ; other causes, 6 per cent. A pyelitis, he holds, may exist without a cystitis, but a cystitis is rarely found without a pyelitis.

For the use of **Hexamine** in cystitis, *see p.* 16.

Bladder Tuberculosis.—Edward Keyes, Junr.,[4] holds that there are cases secondary to inoperable prostatic or bilateral renal lesions, and other cases persisting after nephrectomy, where neither general treatment nor time gives relief. Tuberculin seems to alleviate the bladder symptoms in certain cases; but it is slow, and has been uncertain in his experience. Local treatment is occasionally effective in relieving the painful symptoms. He adheres to three principles in the treatment of such cases :—

1. The instrument must not enter the bladder. A Guyon syringe is used, and introduced into the prostatic urethra, and the solution is injected and flows into the prostatic urethra and base of the bladder.

2. The bladder must not be distended. As good results may be obtained by injecting 5 or 10 drops as by larger quantities.

3. The injection must give relief in proportion to the pain it inflicts.

The author uses four solutions, namely, **Thallin, Gomenol, Bichloride of Mercury,** and **Carbolic Acid.** Thallin sulphate is used in a saturated solution in water (20 per cent), and is much less irritating than a 1–1000 solution of nitrate of silver. It usually gives no relief whatever, but occasionally it is efficacious. Gomenol, though greatly praised by some, has not proved successful in the author's hands. Bichloride of mercury has been of great service. It is used as an instillation, the initial dose not exceeding 1–20,000. This is repeated daily, and the strength increased rapidly up to 1–5000 or 1–10,000, when irritation is usually experienced. The intervals are then increased to two or three days, and the amount of water diminished, so that only 2 or 3 drops are injected. Carbolic acid was recommended by Rovsing, who employs an irrigation in 5 per cent solution, the bladder being repeatedly injected and emptied. The pain caused by this treatment is considerable. Keyes uses carbolic acid as an instillation instead of an injection, in solutions varying from 0·5 to 1 per cent. He finds no great benefit until the solution reaches 2 to 5 per cent.

Diverticula.—Bentley Squier[5] describes an operation performed upon a large diverticulum. The abdomen was opened, and the peritoneum stripped from the bladder and diverticulum. Owing to the extent and connections of the diverticulum, however, the attempt to excise it was abandoned. The bladder was opened, two intestinal anastomosis clamps were introduced, one blade of each into the diverticulum, the other into the bladder. The walls of the diverticulum were divided between these clamps, and the cut edges approximated with a running catgut stitch, thus converting into one the

cavities of bladder and diverticulum. The upper portion of the diverticulum was then excised and the bladder wound closed, greatly reducing the size of the newly-formed bladder.

Tumours of the Bladder.—Swan[6] states that 11 out of 13 cases of villous papilloma were operated on; 1 died of uræmia three days after the operation; 3 cannot be traced; 3 recovered—1 after nine years, 1 after three years, and 1 in fifteen months. The remaining 4 are free from recurrence after intervals of seven, five, four, and two and a half years. In some cases of multiple growths studded over the vesical surface, a radical operation is out of the question, and an attempt may be made to slough off the exuberant growth by means of daily irrigation with solution of **Silver Nitrate,** increasing in strength up to 1–500, as recommended by Herring, or by an open operation to remove the growths separately, and to cauterize the base with a fine **Electric Cautery** point or nitrate of silver.

In cases where a radical operation is not contemplated, symptoms may arise which require treatment. *Hæmorrhage* may be severe, but is seldom enough to endanger life. The patient should be kept in bed, and **Morphia** given with **Calcium Lactate** in 20-gr. doses. If the bleeding is not arrested by these means, a full-sized catheter should be passed, and the bladder gently irrigated with **Hot Saline** solution (115°), or with hot solution of **Nitrate of Silver** (1–5000). In some cases a small quantity of silver nitrate (1–1000) or **Adrenalin** (1–1000) may be run into the bladder, and drawn off after a few minutes. Should clotting have occurred in the bladder, the clots should be extracted by a large evacuating cannula attached to a rubber bulb as used after litholopaxy. If there is severe vesical *tenesmus* it is probable that cystitis is superadded, and suitable treatment should be adopted. Suppositories of **Belladonna** and **Morphia** will relieve the pain, or a suprapubic fistula may be made.

Morton[7] records one case of complete, and three of partial, excision of the bladder for malignant disease. The case of complete excision died seven months after the operation; one case of partial excision was alive and well two years after the operation. One had recurrence in sixteen months, and the other in about two months.

The treatment of papilloma of the urinary bladder with the **High-frequency Current,** introduced by Beer, was described in the Medical Annual, 1914. Ashcroft[8] holds that the bipolar or d'Arsonval current is superior to the unipolar or Oudin current. He considers that the latter, when applied through the cystoscope, has but a limited field of usefulness which is confined to small papillary tumours. When dealing with larger growths or those suspected of malignancy, the d'Arsonval current is indicated. He has seen growths proliferate rapidly under the Oudin current. In using the d'Arsonval current the first application should last fifteen seconds (250 ma.), then a rest of fifteen seconds. The current is again turned on for fifteen seconds (300 to 350 ma.). As the patient grows accustomed to this treatment the strength can be increased. The cases vary, some com-

plaining of pain with a moderate current, and others bearing a strong current without discomfort. The treatment is repeated once a week.

H. Gehrels[9] strongly advocates the use of this method in papillomata of clinically benign appearance if they do not exceed the size of a walnut, even if they are multiple ; in all recurrences of papillomata either after endovesical treatment or after cystotomy ; and in cases of hæmorrhage from malignant growths that cannot be arrested by the usual means. The choice of the right cases is the most difficult point in the whole question of the endovesical treatment by high frequency. There are difficult cases of malignant growth resembling simple papilloma. On making the diagnosis, the author depends upon the age, youth being in favour of a benign growth, long intervals between the hæmorrhages being also a sign of simple papilloma. Pain is rare in benign cases, and the outflow of urine is not disturbed, while the general health is not affected. Cystitis is easily cured in simple papilloma, but is persistent in malignant growth. Cystoscopically the malignant growth is likely to be smooth with a broad pedicle, and there may be signs of infiltration of the mucous membrane.

Iredell and Thompson[10] give an account of three cases of malignant growth at the base of the bladder treated by **Diathermy.** In two cases the bladder was opened and a large portion of the growth removed, and the high-frequency current applied during convalescence. There was no recurrence of symptoms for six and four months respectively. In the third case, the high-frequency current was applied without a cutting operation, and hæmorrhage, which had been profuse, ceased.

Calculi.—In a review of **Litholapaxy,** Willan[11] holds that in skilled hands and in carefully selected cases this is a very safe operation. Recurrence of the calculus does not take place when the patient is cystoscoped after the operation. He considers it is quite as common after suprapubic lithotomy as after litholapaxy, and he draws the following picture to give colour to his view : " Very often vesical calculi only give marked trouble when cystitis has supervened ; if suprapubic lithotomy has been performed when the bladder is septic, it is always wise to employ drainage, and it is wonderfully easy for a piece of ligature or dressing to fall into the bladder and form a nucleus for a further stone. Moreover, if care is not taken after a suprapubic lithotomy to keep the urine acid, especially in the presence of sepsis, a phosphatic deposit adheres to the drainage tube, and fragments of this fall into the bladder, to form the nucleus of another calculus."

The contra-indications given to litholapaxy are those well recognized, namely, enlarged prostate, encysted calculus, sacculation of the bladder, size of the stone, consistence of the calculus, stricture of the urethra with fistulæ, foreign body as a nucleus of a stone, age, stone in prostatic urethra, pyonephrosis or pyelonephritis, malignant growth of the bladder. In regard to age, the author states the age of three years as the lowest limit for litholapaxy in male children. Male

children much younger than this have, however, been operated on by litholapaxy. Freyer records one at eighteen months, and the present writer[12] crushed a stone in a male child of fifteen months.

Retention of Urine.—E. C. Keyes, Jun.,[13] discusses the ultimate results of the Chetwood operation (a modification of the Bottini cauterization of the prostate by means of the galvano-caustic prostatic incisor; whereas Bottini introduced his instrument along the whole length of the urethra, Chetwood performs external urethrotomy, palpates the prostate, and then introduces a shorter incisor through the perineal wound). During the past ten years Keyes has employed the Chetwood operation upon one quarter of his cases of prostatic hypertrophy, and also for the removal of all minor obstructions, such as bars and contractures at the bladder neck, when simple perineal drainage seemed likely to prove inadequate to afford proper drainage for the bladder. In selecting cases for such an operation there is a danger of operating on patients with little or no retention, but suffering from painful and frequent micturition, and who would do as well without operation upon the bladder neck; or, on the other hand, in attempting to relieve by cauterization an obstacle requiring prostatectomy. In many cases the reason for selecting this operation has been the patient's bad general condition, for the Chetwood operation causes less shock than any form of prostatectomy. It may be done under local anæsthesia, or in two stages, and when performed as a single operation it takes only five or ten minutes. The hæmorrhage is insignificant, and the convalescence less stormy than that of prostatectomy. Keyes has performed this operation on 57 cases with 2 deaths. He eliminates from his statistics 1 case of tuberculosis, 4 cases of tabes, and 3 of carcinoma. There were 7 cases of incomplete relief, and 6 of incontinence of urine following the operation. Twenty-seven cases were followed for a year or more, and 17 of these were cured.

References.—[1]*N. Y. Med. Jour.* 1914, ii, 113; [2]*Pract.* 1914, i, 501; [3]*Jour. Amer. Med. Assoc.* 1913, ii, 2038; [4]*N. Y. Med. Jour.* 1914, ii, 449; [5]*Ibid.* i, 1026; [6]*Lancet*, 1914, i, 1309; [7]*Brit. Med. Jour.* 1914, i, 1224; [8]*Surg. Gyn. and Obst.* 1913, ii, 636; [9]*Austral. Med. Gaz.* 1914, 292; [10]*Lancet*, 1914, i, 1745; [11]*Brit. Jour. Surg.* 1914, Jan. 406; [12]*Genito-Urinary Surgery* (Cassell & Co. 1914), 507; [13]*N. Y. Med. Jour.* 1913, ii, 645.

BLADDER, MALIGNANT DISEASE OF. *K. W. Monsarrat, F.R.C.S.*

O'Neil[1] writes on the technique of operation for bladder tumours in the course of an article recording ten cases treated at the Massachusetts General Hospital. **Transperitoneal Cystotomy** is considered the operation of choice in sessile and infiltrating growth where excision seems justifiable. This was performed in five cases. In all the peritoneum was closed. When the resection was extensive, or the ureters reimplanted, the bladder was drained suprapubically.

The ureter had to be divided in two instances. In one no drainage by ureteral catheter was employed, the new ureteral orifice became occluded, and a ureteral fistula resulted. To close this it was neces-

sary to expose the ureter at its renal end, and pass a catheter down to the bladder and out of the urethra. After six days of this drainage, recovery followed. In the second case the end of the ureter was split and sutured to the bladder wall. The peritoneum was then incised where the ureter crosses the bifurcation of the common iliac, the ureter opened, and a ureteral catheter passed into the bladder and out through the urethra. This was removed on the sixth day. The bladder left in this case was small, and the suprapubic wound still leaked when the patient left hospital. [It has yet to be shown that ureteral drainage as employed by the writer is a necessary or advantageous part of the technique, nor is it clear why a separate incision into the ureter was thought necessary in the second case. —K. W. M.]

Watson[2] reviews the present treatment of vesical papilloma and carcinoma. He finds that treatment by **High-frequency Current** is the method of choice for benign bladder growths, and present evidence goes to show it can be relied on to destroy the growth, although it is premature at the moment to speak with certainty as to permanent cure. In cancer it relieves symptoms but is not curative. Transperitoneal **Partial Resection** of the bladder is the best method of dealing with cancer. There is no evidence at present on which to base an opinion as to the value of **Total Cystectomy,** as it has rarely been done under favourable circumstances. Watson holds that the operation should be done in two stages : (1) The diverting of the urinary secretion ; (2) The removal of the bladder. He considers that a bilateral nephrostomy is the only safe method of diverting the urine, and has devised a special apparatus which keeps the patient dry.

Mayo,[3] in the course of an article on exclusion of the bladder, speaks of the methods employed in cases of cancer. In eight cases of partial cystectomy the ureter was transplanted into the bladder wall on the sound side. In three cases the bladder was removed entire. (1) A female, age 62 : ureters transplanted into the rectum ; recovery from operation, but death some weeks later from cerebral hæmorrhage. (2) Female, age 20 : The ureters were attached to the base of the urethra by Sonnenberg's method. The patient remained well for a year, when she died from renal infection. (3) Male, age 50 : The ureter was implanted into the back transperitoneally. He had remained well for over three years.

Young[4] contributes a study of 117 cases of bladder tumour. Of these only 17 per cent were benign. Young states that almost all tumours primarily benign become malignant. He records certain remote benign recurrences which are difficult to explain, as every care was taken to prevent implantation of tumour particles at operation by going wide of the tumour, cauterizing its entire surface, and protecting the wound.

The classification, according to treatment, is as follows : (1) Suprapubic excisions, 47 cases ; (2) Fulguration, 19 cases ; (3) Suprapubic drainage, 22 cases ; (4) Suprapubic partial excision, with destruction

of the base by cautery or fulguration, 5 cases; (5) No treatment, 28 cases. The 47 cases of excision are further divisible into three groups: (*a*) Excision with pedicle and a portion of the vesical mucosa, 23 cases. Of these, only 9 proved benign, and the results of operation were bad—" not nearly so good as is now obtained by fulguration." Of the 14 malignant cases in this group, in 2 only was a cure obtained. (*b*) 4 cases, in which excision of the tumour was accompanied by a more extensive removal of the adjacent vesical mucous membrane. These cases were all thought to be benign. Only one patient has been apparently cured. (*c*) 20 cases with more or less extensive resection of the entire thickness of the bladder wall adjacent to the tumour; 17 were cases of cancer, and of these, 7 were found to be practically hopeless at operation. Of the remainder, in 3 only were there recurrences, and the results obtained by excision are far superior to those obtained by removal of the tumour with the pedicle and adjacent vesical mucosa.

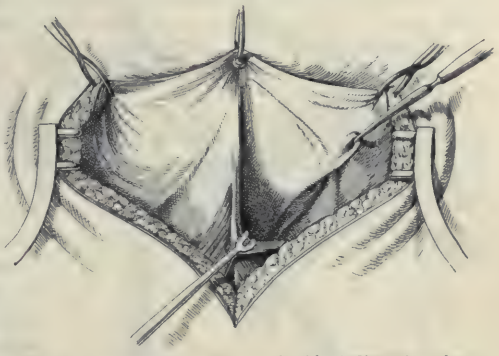


Fig. 6.—Exposure of left ureter by blunt dissection along the course of left vas deferens.

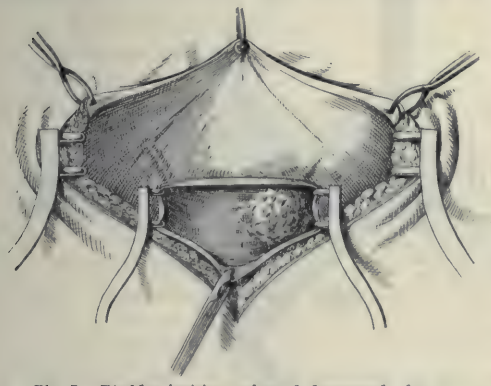


Fig. 7.—Bladder incision enlarged downwards for more thorough inspection.

Young concludes: " Carcinoma of the bladder, except in very extensive cases, is best treated by suprapubic resection, leaving a wide area of healthy wall around the tumour (cautery used if possible), ureter transplantation if necessary, and peritoneum excised when the tumour involves that portion of the bladder. Intraperitoneal operations are rarely necessary (except in tumours of the vertex and posterior wall), as an excellent view of the bladder can be obtained by an extensive median incision, wide separation of the recti muscles, upward displacement of the peritoneum, a long incision into the bladder, and good retraction. The use of 50 per cent resorcin or alcohol to kill any tumour particles which may have

dropped into the bladder also seems desirable; but a better plan is to cauterize the tumour thoroughly before beginning the resection of the bladder. For benign tumours the treatment with the high-frequency spark seems thoroughly satisfactory." "In apparently hopeless cases, destruction of the tumours and their bases and adjacent portions of the bladder wall by means of a Paquelin, hot-air, or electric cautery may occasionally give unexpected cures and brilliant results."

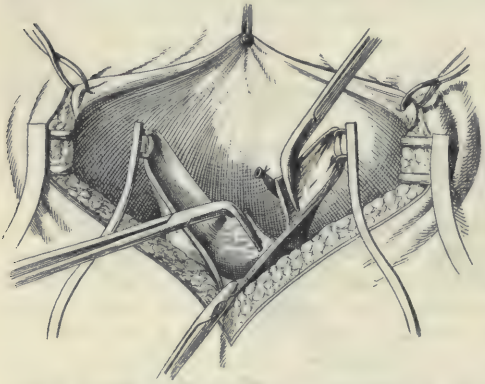


Fig. 8.—The neoplasm and affected ureter excised *en masse* with wide margin of healthy tissue; hæmostasis secured by right-angled tissue forceps; temporal ligature around proximal reter

Squier and Heyd[5] describe their technique for radical extirpation of vesical neoplasms. The growth is removed *en masse* with a wide margin of healthy tissue; the technique exposes the bladder in its entirety, and renders it possible to free the posterior and fundal attachments as far as the trigone without an unusual degree of hæmorrhage or traumatism. The steps of the operation are as follows: The peritoneal cavity is opened (in the authors' last three cases the peritoneum has been reflected without opening), the prevesical space is exposed; laterally the obliterated hypogastric arteries and the vasa deferentia are exposed, and by following the latter the ureters are demonstrated on each side (*Fig.* 6). The peritoneum is completely stripped off the fundus and down to the posterior edge of the trigone. The bladder is then incised mesially, and the incision extended so as to give a wide display (*Fig.* 7). The incision then extends around the growth with a wide margin of healthy wall (*Fig.* 8). If the ureter is involved it is cut above the growth, implanted through a stab wound, and fixed by

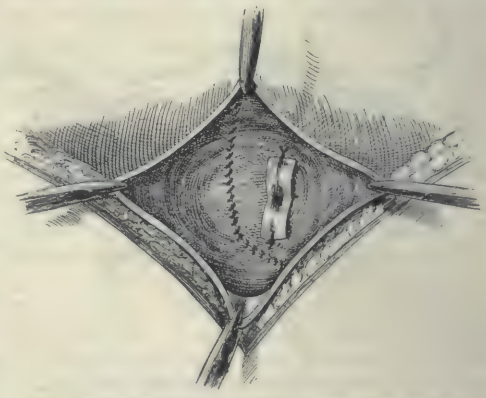


Fig. 9.—Implantation of divided ureter after partial closure of bladder defect.

splitting and suture (*Fig.* 9). The wall is then sutured with chromic catgut; a drainage tube is introduced at the apex of the re-made bladder (a 26 F. soft catheter being suitable), fixed by a suture. If the peritoneum has been opened it now requires accurate closure; into each lateral space a cigarette drain is introduced. Finally, a self-retaining catheter is passed through the urethra into the bladder.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1913, ii, 305; [2]*Urolog. and Cutan. Rev.* 1913, xvii, 64; [3]*Trans. Amer. Surg. Assoc.* 1913, May; [4]*Jour. Amer. Med. Assoc.* 1913, Nov. 22; [5]*Surg. Gyn. and Obst.* 1914, ii, 91.

BLINDNESS, CAUSES OF. *A. Hugh Thompson, M.D.*

Bishop Harman[1] has published an analysis of the causes of blindness in 1100 children examined by him in the London blind schools, all either totally blind or without sufficient vision to be of any use for the practical purposes of life. The table (*Fig.* 10) graphically summarizes his conclusions. It will be noticed that of the whole number examined, practically one-quarter (24 per cent) owe their blindness to ophthalmia neonatorum of gonorrhœal origin. Large though this proportion is, it is satisfactory to know that the incidence of the disease has shown a marked diminution in the last ten years. In 1904, and again in 1906, the proportion of children in the blind schools blind from this cause was as high as 36 per cent. On the other hand, the proportion of cases in which syphilis is responsible shows a marked increase on the figures for former years. Most of course are cases of interstitial keratitis; but it will be seen that as many as 11·5 per cent of the total are cases of syphilitic choroiditis and optic atrophy. It will surprise some to find that phlyctenular keratitis is not a more important cause of blindness than it is. If, however, instead of blindness, defective sight were being investigated, it would occupy a far more prominent position in the table. Harman concludes by remarking: "The sum total of this examination of these blind children is the finding that more than one-half of them owe their miserable state of blindness to venereal disease of their parents."

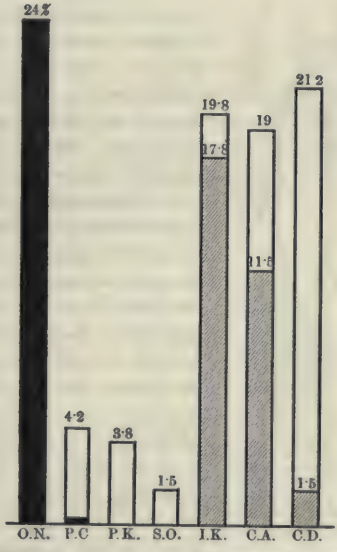


Fig. 10.—Causes of blindness (Harman).

REFERENCE.—[1]*Brit. Med. Jour.* 1914, ii, 390.

BLOOD, CLINICAL PATHOLOGY OF.

O. C. Gruner, M.D.

Technique.—The clinical examination of the blood claims constant attention in many quarters. The tendency to regard this work as the peculiar province of the specialist is deprecated by Pappenheim,[1] who has put forward essentially practical rules for the execution of blood-counting.[2] He points out that the investigation of the hæmoglobin content and the execution of a count *lege artis* are sufficiently easily undertaken to demand being faithfully utilized at all times.

The following data call for determination in each clinical case :—

1. *Estimation of the Hæmoglobin.* — For this purpose either the Tallquist hæmoglobin scale, or the more simple appliance devised by Wetherill, of Philadelphia,[3] can be employed. The reviewer can recommend the latter. It consists of a disc like that of the Wellcome exposure meter, divided off into segments painted the colour of successive percentages of hæmoglobin content. A circular opening of small size is punched in each segment. A drop of blood from the finger is absorbed by close-grained blotting-paper and held against each aperture till the match is found. While this is suitable for routine cases, special ones will be worthy of the Haldane instrument.

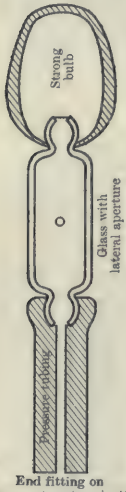


Fig. 11. Appliance to hæmocytometer pipette.

2. *Cell-counting.*—Kitt[4] has devised a new form of rubber teat, which bears a terminal loop through which the finger is passed. Pappenheim[2] has devised a special form of pipette, not stocked in England. As the same purpose is achieved by a simple appliance made by Messrs. Reynolds and Branson, Leeds, at the reviewer's suggestion, reference may be made to it here. Any one can construct it for himself, as is seen from the accompanying diagram (*Fig.* 11). After the blood has been drawn up to the desired mark in the ordinary way, a little of the diluting fluid is sucked up till all the blood is within the mixing-chamber. The mouthpiece is now removed and the appliance employed. The thick rubber tubing readily fits on the end of the pipette, the stout rubber ball is slightly squeezed in the hollow of the right hand, and the thumb is then placed firmly on the lateral aperture. On releasing the pressure in the bulb, the diluting fluid is readily drawn up. When it has reached the desired upper mark, the thumb is instantly removed, and the suction ceases.

Fig. 12.—Metz's disc.

Metz[5] has devised an ocular which contains a disc (*Fig.* 12) divided into sub-fields in a special way, rendering the use of a graduated counting-chamber unnecessary. The diluted blood is placed in

a chamber exactly as before, save that there are no rulings. The ocular is inserted into the microscope with the No. 6 Leitz objective, and the number of cells counted by the aid of the squares on the (photographic) disc within the ocular. The first figure of the value giving the total red cells within the inner square corresponds to the number of millions per c.mm. Similarly, the total number of white cells seen in the whole microscopic field gives the number of thousands per c.mm. The number of the eyepiece used is II. Schirokauer has spoken favourably of this contrivance.[6] It is made by Leitz, Wetzlar.

3. *Smears.*—Giemsa[7] recommends liquid paraffin as a medium for mounting specimens stained by Romanowsky methods, or for storing unstained blood-films. Pappenheim's panoptic method ([2],[8]) is the best for all careful differential counting.

The Cell-Content under Normal Conditions.—

Observations upon the cell-content of the blood of new-born infants were published by Biffi and Galli.[8] The red cells rise to a maximum on the second day and fall to an average of 4·5 million per c.mm. on the thirteenth. Nucleated red cells cease to be seen in the stream after the sixth day. The white cells rise up to the seventh day, as a neutrophilia ending in a lymphocytosis. It may be noted that the large mononuclears, transitional cells and eosinophiles are increased during the early months. The cell-counts show remarkable variations during the day. The white cells are fewer during rest and sleep, and are much increased in numbers during crying (Wernstedt,[9] Schkurina[10]). Orland[11] found that vigorous myelocytosis occurred at the time of weaning. During childhood the total and differential counts vary from year to year, as might be expected. The following figures are drawn up from a paper by Rabinowitsch, and will be of use in deciding upon the existence or not of changes in the white-cell formula.[12]

Age	Total per cmm.	Neutrophiles	Lymphocytes	Eosinophiles	Transitional	Mast Cells
1–2	6500	1950=30%	3965=61%	234=3·5%	162=2·5%	25=0·4%
15-16	8000	5440=65%	1840=25%	328=4·5%	258=3·2%	50=0·6%

The Cell-Content under Pathological Conditions.—

Changes in the Gross Count.—The number of red cells is diminished in most infections. It is with the leucocytes that the main interest lies. Thus, a careful study of the blood in pneumonia by Hess[13] shows that the leucocytes increase in numbers according to the severity of the infection. The rise is higher in the case of children than with adults. A very high count means severe infection with strong resistance. A medium count means slight infection with good resistance, or severe infection with poor resistance. In this way it is possible to draw up certain guides to prognosis. Hess points out that if neutrophilia is not present, it indicates the co-existence of some other

organism than a pneumococcus. A persistently high count indicates the presence of empyema. According to Barach[14] and other observers, there are two important exceptions to the appearance of leucocytosis —one in mumps, where there is more leucopenia even than in typhoid ; the other in measles after the appearance of the rash. Lucas[15] has found leucopenia throughout measles, and even for some days before the rash appears.

Changes in the Differential Count.—The rule is for a leucocytosis to concern the neutrophiles mainly. Kahler[16] found that lymphocytosis is common in scrofulous children, while Perls notes it in the case of

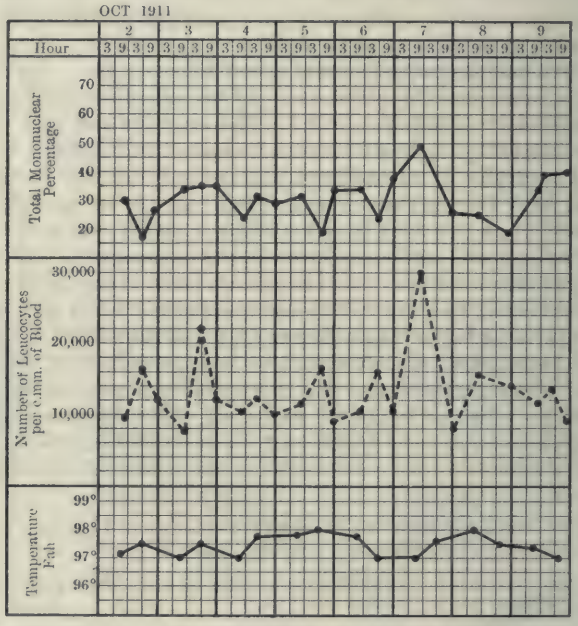


Fig. 13.—Charts showing daily variations in the leucocytes in case of lymphosarcoma (after David Thomson).

rickets.[17] In this connection the occurrence of acute lymphatic leukæmia may be borne in mind. Bilz[18] has observed this disease to be quite common in children. The similarity of its course to that of an ordinary infection makes it essential that routine blood examinations should be made.

Schwermann[19] discusses eosinophilia in tuberculosis of the lungs, and does not consider it a characteristic phenomenon. Aschenheim,[20] Putzig,[21] and Kroll-Lifschütz[22] discuss its appearance in hæmorrhagic diathesis, the former considering it irregular, while the latter two are accustomed to attach importance to its presence. The last-named finds that eosinophilia may persist in children after an attack of purpura,

and concludes that the two conditions (eosinophilia and hæmorrhagic diathesis) may depend on a common cause. Dudtschenko[23] records a case of natural infection in a white rat by a *pestis*-like organism, killing by septicæmia and associated with marked eosinophilia. He refers to the undoubted fact that the eosinophile is related to the production of immune bodies. This subject is fully discussed by the reviewer elsewhere.[24] Desoil[25] refers to the diagnostic value of eosinophilia in echinococcal infection. In two cases the count was 4·5 and 5 per cent respectively. He draws attention to the fact that some of the eosinophiles were myelocytes.

[It appears quite definite that eosinophile micromyelocytes occur in 'ordinary' blood-counts with surprising frequency, and this requires explanation by further research.—O. C. G.]

Roberts[26] describes eosinophilia as occurring in cases of hay fever, especially when asthmatic symptoms are present. Hess[13] notes complete absence of eosinophiles from the blood stream before the crisis of pneumonia.

The importance of the large mononuclear leucocyte is being more and more appreciated with each year. A matter of considerable importance lies in the question of what a large mononuclear leucocyte is. Hitherto there has been a tendency to include 'hyaline leucocyte,' large lymphocyte, lymphoid leucocyte, macrocyte, and many other terms. The use of Pappenheim's name of 'monocyte' will be found convenient. The details of distinction between the different cell forms which simulate the monocyte are fully dealt with elsewhere.[27] Those interested in the subject will notice the difficulty which indiscriminate use of the various terms creates in collecting statistics. Some very valuable data are given by Thomson,[28] who shows that these cells vary in number from hour to hour during the day, in such diseases as Hodgkin's, cancer, lymphosarcoma, pernicious anæmia, and myositis ossificans. The charts (*Fig.* 13) show the variations in total mononuclear cells; it is likely that a sub classification of these cells would have been very much more instructive, and it may be expected that investigations of this kind will be made. The subject is of considerable importance as throwing a light on the nature of certain diseases whose organismal cause has not been established.

Attention has been drawn to the value of Arneth's system of classification of the neutrophile leucocyte,[28a] in spite of the objections raised to the procedure by academic hæmatologists. The accompanying plates (*Plates IX–XI*) indicate the great range of form presented by the nuclei of the neutrophile leucocytes, and further bring out the fact that the ordinary histological indications of necrobiosis are presented by many a blood-film, in that the nucleus becomes poorly stained, and the cell substance ill-defined and polymorphous in outline. There is a possibility of this phenomenon being the result of preparation of the film; but this matters not, because the fact that all neutrophiles are not alike merely means that some are unduly friable. This friability, or fragility, of the white cells is of

much clinical importance, and, as far as the reviewer knows, has not been correlated with any clinical conditions up to the present time. The explanatory notes to the plates will suffice for our purposes. As has been advocated,[28b] it is advisable to construct a blood-cell graph in differential counting, because subtle variations occur from which

EXPLANATION OF PLATE IX.

NEUTROPHILE LEUCOCYTES.

A series showing variations of polymorphism of the nucleus. **1–25** are cells with continuous nuclear matter; **26–49** are cells in which the nuclear matter is more or less completely divided into two portions. It is convenient to describe the last series as examples of amitotic division of cells. For the purposes of the demonstration it matters not whether this be a true description or not, because it will be found that complete division of nuclear matter in this way is definitely associated with particular clinical conditions.

The series is presented in order to show the variations which may be found in each type of cell. **1–25** exhibit many forms of nucleus, with a common feature, that there is either no bridge at all or that it is very little narrower than the main body of the nucleus. In this series we include the tri- and quadri-lobed forms, as these may be classified as variants of the rod-like nuclei, rods with lateral bud-formation, which tend ultimately to appear as trifid or quadrifid nuclei *(Plate X)*.

1 shows a cell not far removed from a myelocyte; notice the myelocytar markings. **2–6** are rod-like nuclei with slight beading.

4 might be called a quinque-lobate form, only that the lobation is not very marked, the nodules having a broad base, without definite constriction. In this way the nucleus is seen to be more rod-like than it is in **15**, where the buds are becoming distinctly pedunculated.

7 presents a metamyelocytar form of nucleus; this is repeated in **12** and **13** with additional spicules arising from the original horse-shoe nucleus.

13 has a much more slender nucleus, which distinguishes this type from the true metamyelocyte.

8–11 are examples of S-shaped nuclei, **8** being a very typical form. In **11** the limbs of the S are compressed, giving an unusual form to the nuclear mass.

14 and **15** are examples of lobation of nucleus, a feature very frequently noted, and easily described as 'ideographic nucleus' owing to the close resemblance to the radicles of the Chinese ideograms. The two-, three-, and four-stroke radicles in that language are exactly reproduced in many of the nuclear forms of this type.

17, with a more pale-staining nucleus, broad equally along its length, conforms more to the type of true metamyelocyte, which has not advanced far from the myelocytic stage of differentiation.

18 resembles **11** except in its feeble staining power and greater width.

19–21 show nuclei like that of **7**, probably observed from different angles. **22–24** are lobate forms.

25 shows a dumb-bell form, a transition to the next stage of complete amitotic division of nucleus, seen in **26, 28, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 46, 48, 49.** These differ in the size of the nuclear masses, in the distance between the masses, and in irregularity of form of each portion. **38** shows great inequality of the partition. **40, 41, 39** show commencing lobation of one of the segments. This may be looked on as a progressive change towards a tri- or quadri-partite nucleus *(Plate X)*.

30, 43 are of interest in showing strands of nuclear matter running between the adjacent masses and so recalling mitotic figures.

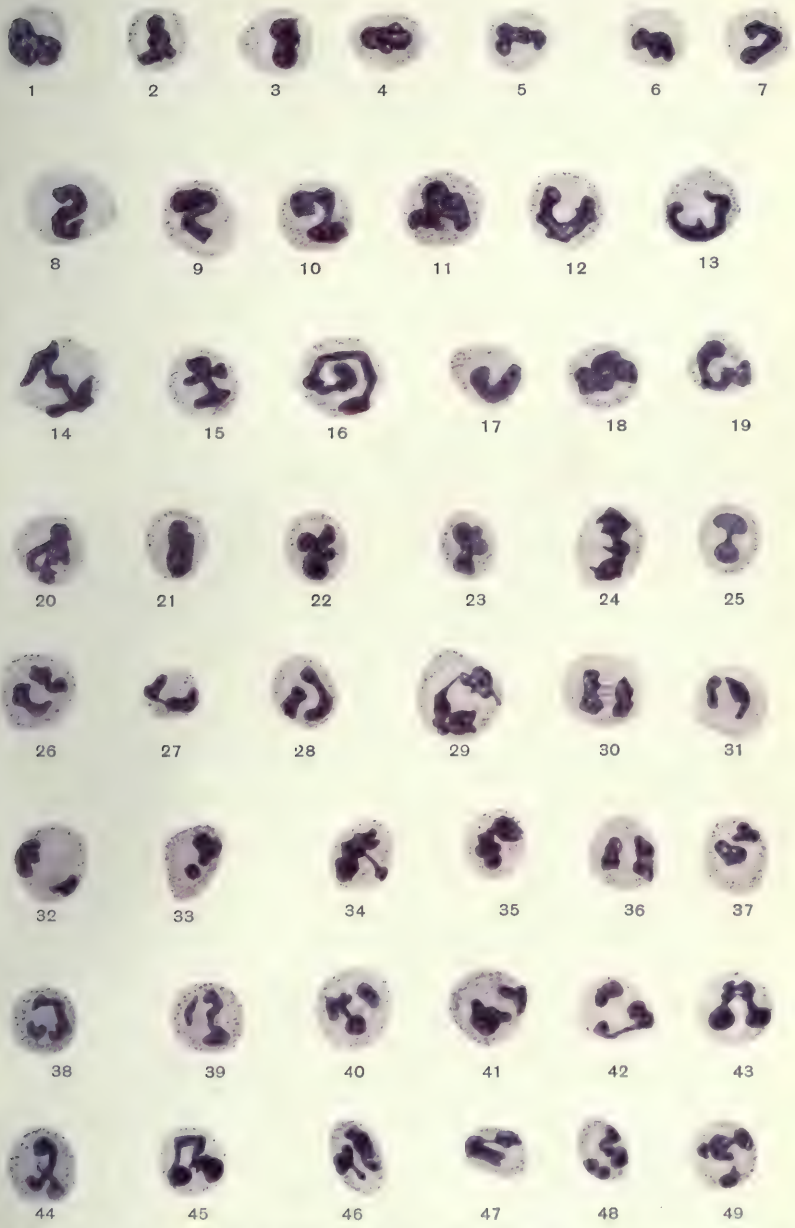
In **36** the granules are confined to the space between the discrete nuclear masses. The following form a series: (**25**) in which the original nuclear mass shows commencing nipping in; (**27**) division all but for a fine bridge: (**30**) with several strands; (**26**) complete division, with closely-packed segments; then from this to a form with movement of the segments to the extreme edge of the cell (**32**), and subsequent further subdivision (**49**) to form cells like those on *Plate X*.

48 is a transition to a quinquepartite cell, each portion of the doubled nucleus becoming beaded.

important deductions can be made. In *Fig.* 14 is shown the method of construction of such a graph, and two opposite types are exhibited, one from a case of pneumococcal infection, the other from an acid-fast or (?) protozoan infection. The successive ordinates give the increments, i.e., the highest point of the curve

PLATE IX.

NEUTROPHILE LEUCOCYTES



Plates I, II and *III* show cells stained by Pappenheim's panoptic method, and are drawn as seen with the oil-immersion lens and No. 6 Zeiss eye-piece.

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represents the total percentage of the particular class of cells. It is seen that there is a very steep rise from 4 to 5 in the acute infection, pointing to a very active subdivision of leucocytes within the blood-stream. The flatness of the curve from 5 to 8 shows there is little destruction of leucocytes. The large mononuclear cells are relatively very scanty. The other curve shows a small gradient from 5 to 6, and a steep gradient from 7 to 8, which points to marked destruction of the leucocyte, presumably by microbic toxins. The monocyte curve has a low gradient, but is on a higher general level than in the preceding case (slightly supernormal).

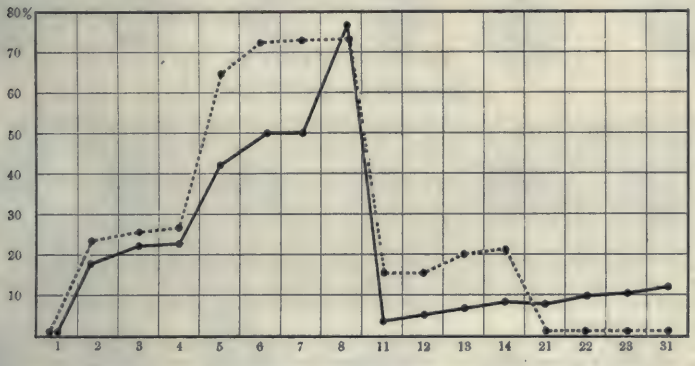


Fig. 14.—Graph illustrating white-cell counts. The continuous line is from a case of pneumococcal infection. The dotted line is from a case of lymphogranuloma.

The rising lines are constructed on the increment principle, so that the reading at the end of each group of cells gives the total percentage.

The falling lines indicate that there is not necessarily a genetic sequence from one continuous line to the next.

1-10—*Neutrophiles:*
1—With S-formed Nucleus
2— ,, Horseshoe ,,
3— ,, Rod ,,
4— ,, Bizarre ,,
5— ,, Bipartite ,,
6— ,, Tripartite ,,
7— ,, Multipartite ,,
8—Dead

11-20—*Lymphocytes:*
11—Normal
12—Leucocytoid
13—With Reniform Nucleus
14—Mesolymphocytes

21-30—*Monocytes:*
21—Normal
22—Leucocytoid
23—Bizarre

31—*Transitional Cells*

The Cell-Content in Various Diseases.—

It is convenient to collect together the studies of blood made in relation to various diseases, both treated and untreated. A number of papers on this subject have appeared during the year. In *amyloid disease* the blood may become unduly rich in red cells (Gullbring[29]). In small-pox, Erlenmeyer and Jalkowski[30] find lymphocytosis during the early days of the rash; neutrophilia is a feature of primary *vaccination hooping-cough* shows a leucocytosis of 27,000 to 85,000 during the first three weeks, the increase involving the lymphocytes (58 to 63 per

cent). The large mononuclears are also increased (Schneider[31]). Halpern[32] finds lymphocytosis constantly in *diabetes*, but attaches no diagnostic or other importance to it. He points out the interest of the finding, in respect of the relation of the ductless glands to the pathogenesis of the disease. Fackenheim[33] finds that microcytes are extremely numerous before and for ten hours after an *epileptic* attack. Eosinophilia is noticeable, as well as a monocytosis, the total leucocyte count being raised before and after the attack. The coagulation time is increased, and the platelets are much increased. Riebes[34] describes exactly similar phenomena.

A study of the red cells in *tuberculosis* was made by Gullbring.[35] Both red cells and hæmoglobin content vary greatly, falling during

EXPLANATION OF PLATE X.

NEUTROPHILE LEUCOCYTES.

The cells drawn on this plate are all characterized by the possession of a multifid nucleus. The first four horizontal rows show variations of tripartite nucleus; the last four rows variations of multipartite (four or five) nucleus.

1 shows a bipartite form in which one of the two portions is itself undergoing amitotic division, analogous to the cell **30** of *Plate IX*.

2 shows the clover-leaf form. **3** shows the form familiar to all text-book drawings, a very common variety of neutrophile, with three 'lobes' connected by fine bridges. **4** shows a cell with three complete discrete lobes, and no visible bridges. It will be seen that they are a distance from each other. Similar cells are **5**, **6**, **16**, **20**, **21**, **22**, **29**, and **30**, the nucleus showing some slight variation of form in each case. In **22** the staining power of the nuclear matter is feeble, suggestive of a 'dying' condition of the cell.

7–10, **13**, **17**, **19**, **23** show different forms in which the lobes of the nucleus are either all closely connected, or give the appearance of a bipartite nucleus, the one lobe now becoming much indented.

11 is a variant of **3**, evidently seen from another angle.

25 and **26** are bizarre types, in which the nucleus is long, slender, and serpentine; **28** is another serpentine form with beading.

30 shows commencing division, apparently about to become a quadripartite nucleus; **31–36** are lobate forms, which may be compared to **4**, **22**, and **23** of *Plate IX*.

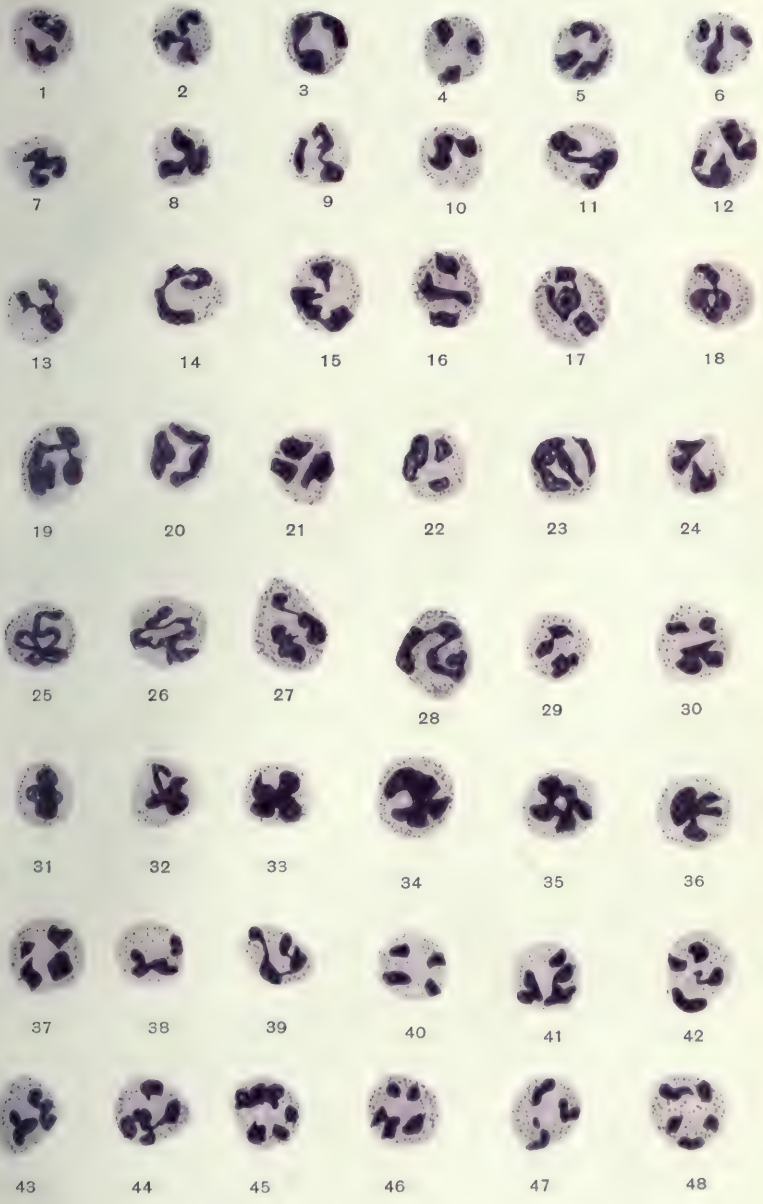
35 shows a ring form of nucleus rarely seen in man. The last two rows show examples of complete segmentation into four parts; **46**, and **48** into five parts. **39** shows the parts connected by fine bridges.

The cells on these two plates are arranged in an order regarded as possibly consonant with progressive breakdown of the nucleus. The view is borne out by an analysis of the cases in which the different cell-types prevail. To a large extent, the classification is interpreted in the same way as Arneth's system, but the complexity of the latter is removed by tabulating the leucocytes according to the number of segments. Connection by bridges does not vitiate the tabulation, as excessive beading may signify a change akin to that indicated by complete segmentation of nucleus.

the first stage, especially if fever be present. There may be no increase even in cavity cases. The discrepancy of results which has been noticed is due to the presence or absence of amyloid disease (see above). Schwermann[36] studied the differential count in 229 cases. The neutrophiles and lymphocytes were found to bear a definite relation to the percentage composition, varying according to the severity of the diseases and the resistance of the patient. The early cases show lymphocytosis and neutropenia. The severe and slightly febrile cases show the neutrophiles normal or slightly increased, while the lymphocytes tend to become subnormal. Later cases show marked neutrophilia, and subnormal figures for the lymphocytes. The values are, of course, altered by secondary infections. Weiss[37] considers that

PLATE X.

NEUTROPHILES WITH MULTIFID NUCLEUS



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the prognosis is better if the lymphocytes reach a relatively high figure, and that iodine benefits by stimulating lymphocytosis. Trumpe[38] studied 36 ' scrofulous ' children, finding an average morning count of 7000, relative lymphocytosis and slight rise of eosinophiles being noticed in healing cases. Fistulæ are associated with a slight rise of the total count ; but if there is fever, the leucocytosis becomes polynuclear. It is interesting to note that the same features are reported as occurring in the blood of tuberculous cattle, rabbits, and guinea-pigs (Scholz[39]).

Effect of Treatment.—Rolleston and Boyd[40] found decided improvement of the blood condition in lymphocytic leukæmia after the employment of **Benzol.** The cell-count fell from 60,000 to 4000 in six weeks. The abnormal cells were still present in the same proportion. Ross[41] gives a chart of this case, which shows what appears to be very definite improvement in the blood condition during the treatment. McLester[42] employed the drug in a case of polycythæmia rubra. The red cells fell from 8·3 to 4·5 millions per c.mm., the reduction being maintained after cessation of the treatment.

Wolpe[44] reports on the blood change under the influence of **Phytin** (vegetable phosphorus). The number of red cells increased by 5·7 per cent, the leucocytes by 10·6 per cent.

Experimental work on *anaphylaxis* by Miracapillo[45] shows polynucleosis to occur during the latter part of the incubation period. This is maintained during the shock. Aschenheim[46] has found that exposure to direct **Sun Rays** causes a general hyperleucocytosis, and a strong relative lymphocytosis with relative neutropenia. Bordoni[47] finds rapid regenerative processes under **High-frequency** treatment in connection with the red cells. Brasch[43] finds that leucopenia is a feature of the rigor after **Arthigonin** (gonococcal vaccine) injections. In four and a half hours a very high neutrophilia occurs, the lymphocytes fall very low, and the other white cells almost entirely disappear. The normal relations are restored in twenty-four hours.

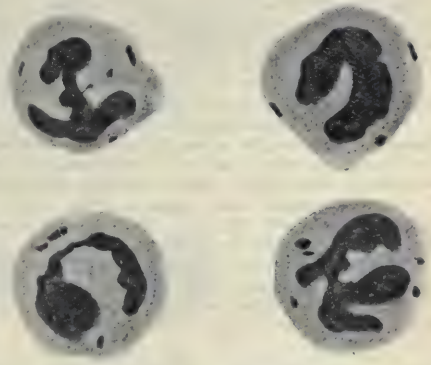


Fig. 15.—Doehle's inclusion bodies.

Variations in Cell-Content Presenting Specific Aid to Diagnosis.—Fiske[48] finds that the total white-cell count varies sufficiently in the case of tuberculous and septic osteomyelitis to afford a valuable indication for diagnosis. In tuberculous cases the total numbers are usually less than 12,000, in septic cases always more than 16,000, and usually more than 18,000. The only fallacy arises when the patient

gives a bad reaction to the pyococci; but the temperature curve, history, and other signs help.

The inclusion bodies in scarlet fever go by the name of Doehle's inclusion-bodies (1911). They have attracted much attention of late. They are round, oval or pear-shaped, rod-shaped, or sickle-shaped structures, which stain dull red with pyronin. They are generally in opposed pairs within the neutrophiles (*Fig.* 15). They are best detected by Pappenheim's carbol-methyl-green-pyronin. Rosanoff[49] found them in a number of diseases other than scarlet fever (cancer, pneumonia, syphilis, acute leukæmia, measles, diphtheria, rötheln). For this reason the test is obviously not specific. On the other hand, Rosanoff, Webb Hill,[50] Isenschmid and Schemensky,[51] Farfel,[52] and Otschkin[53] all agree that if the bodies are not found within ten days the case is not one of scarlet fever. The number of bodies found

EXPLANATION OF PLATE XI.

DEAD AND DYING LEUCOCYTES.

The illustration includes forms derived not only from the neutrophile, but also from the lymphocyte and monocyte series. The signs of death consist in (1) The defective staining power of the nucleus; (2) Alteration in tint; (3) Ground-glass appearance; (4) Loss of definition of outline; (5) Increase of size of the whole cell. The granules are preserved to quite a late stage in the process of death. The type of change has some relation to the condition from which the blood is derived. Thus the case showing **13** will not show **1** and **2**.

The commonest form of necrobiosis met with in neutrophiles is represented by **1** and **2**. Here the nucleus is tripartite and merely shows an altered tint (metachromatism, subchromatism).

Various degrees of disappearance of nuclear structure are shown in **5**, **6** and **7**. **8** shows granular change at the edges of the nucleus, and a delicate fibrillation is well shown in **13** and **18**. Complete loss of granules is shown in **30** and **11**, almost complete in **12**. **5** and **14** are abnormal cells. **15** and **16** well show the appearance of the so-called Klein-Gumprecht shadows.

Commoner shadow forms appear in **17-22**, which are probably necrosed large mononuclear leucocytes (monocytes). **22** shows a monocyte with a curiously lobated nucleus, and distinct colour change in the cytoplasm (basophilic tendency).

23 shows a leucocytoid lymphocyte which has undergone marked alteration of staining-reaction, the nucleus being of a much more blue colour, and the cytoplasm somewhat oxyphilic.

24 is a shadow form bearing little resemblance to a known cell. The nucleus alone remains, though in an advanced degree of dissolution.

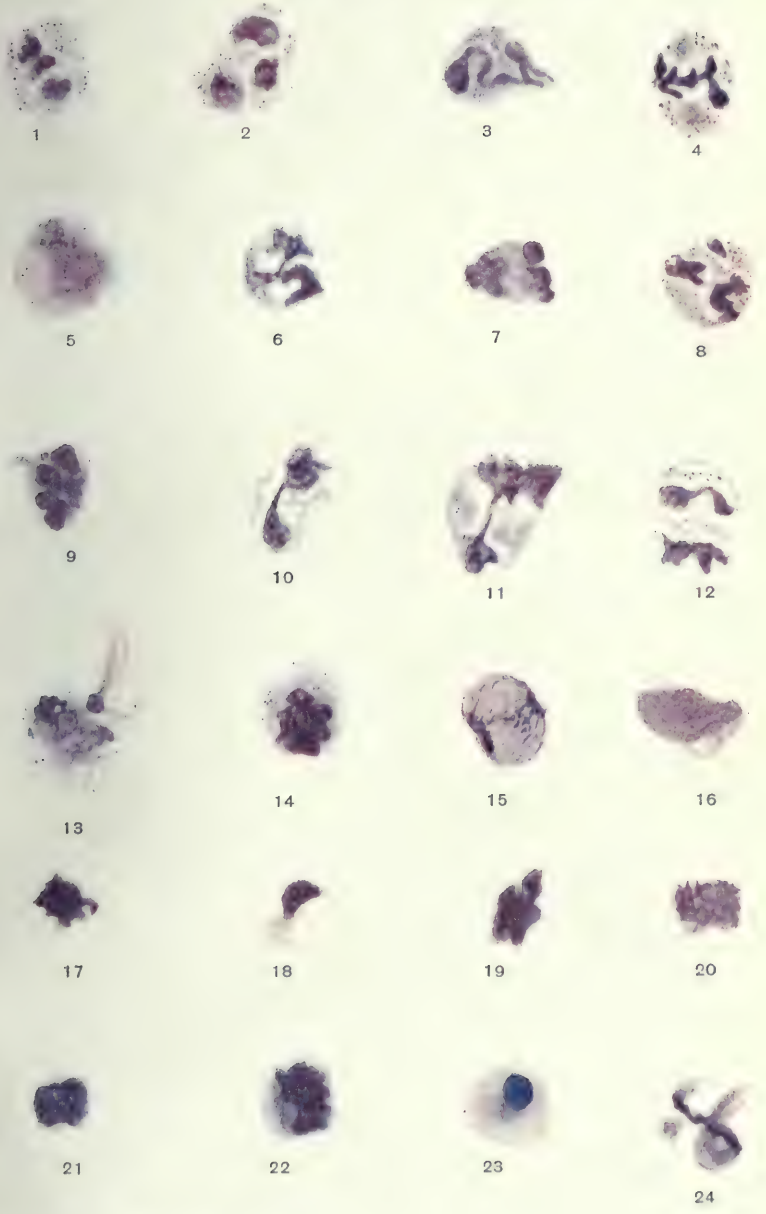
bears some relation to the severity of the case. If found in a case of bad sore throat the patient should be looked on with suspicion. Several theories have been advanced as to the nature of these bodies. Possibly they are cytoplasmic, possibly nuclear. It is quite possible that they are altered cocci.

Bigland[54] finds the fragility of the red corpuscles normal in exophthalmic goitre and paroxysmal hæmoglobinuria, and increased in polycythæmia. Höber[55] refers to the variations in permeability and resistance in the case of the red cells of various animals. He gives a careful study of the action of carbohydrates of the different groups, as bearing on certain points in the pathology of diabetes.

Gullbring[56] finds that the viscosity of the blood varies with the percentage of neutrophile leucocytes. W. B. Cannon and others publish a series of elaborate papers in the *American Journal of Physiology*[57] on coagulation time, which are well worthy of careful perusal

PLATE XI.

DYING AND DEAD LEUCOCYTES



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by those interested. A special form of automatic coagulometer is described, but is not applicable to clinical needs. They show the relation between adrenalin secretion and splanchnic nerves to the rate of coagulation.

The estimation of the amount of *sugar* in the blood is discussed by Kraus[58] and Maclean.[59] Kraus employs fifteen drops of blood. This is de-albuminized, and a special capillary burette is used. Titration is by means of a modified Fehling solution. MacLean's method requires 2 c.c. of blood. The normal infant blood contains between 0·07 and 0·11 per cent of sugar (Mogwitz[60]). Hyperglycæmia was noticed to occur in women immediately before and during the menstrual period (Kahler[61]). A study of the distribution of the sugar between the red cells and the plasma is published by Tachau.[62] Roth[62a] gives dextrose, and then estimates the blood-sugar to see if there is alimentary hyperglycæmia (diabetogenic).

Dorner[63] finds that uræmia is characterized by the occurrence of a distinct amount of *indican* in the blood, and considers that this fact should be of assistance in diagnosis.

Retention of *nitrogen* in the blood is important for prognosis in nephritic cases (Owssiannikowa[63a]).

Kocher[64] found that an increase of *uric acid* in the blood may be met with in (*a*) gout, (*b*) severe renal disease, (*c*) all conditions in which there is increased cell-destruction, such as leukæmia, cancer, hyperpyrexia. Steinitz[65] has devised a new method of analysis. The normal figures are 2 to 4 mgrams per 100 grams blood in the normal person, 4 to 8 in gout. He finds that atophan reduced the content. Brugsch and Kristeller[65] suggest a simple method of analysis — 0·1 c.c. serum + 10 volumes water + 10 per cent phosphotungstic acid + sodium carbonate gives a blue colour with uric acid. Read off on a colour scale like Tallquist's.

Masslow[66] finds that the *lipase* remains normal in rickets, but the catalytic power of the serum is increased. The ferments are much diminished in athrepsia.

Gowland Hopkins,[67] in the Oliver Sharpey Lectures, referred to the increased attention paid to this important subject. Micro-analytical methods for estimating the blood-gases and the ionic concentration of the blood, have been followed. While the papers are of great interest, they do not fall within the domain of clinical pathology. Other papers on the subject of the reaction are, however, of interest in this connection. Michaelis and Kramsztyk[68] show that the method of determining the ionic concentration reveals that in diabetes there is no acidosis of the blood, but of the tissues. Sellards[69] presents a clinical method for studying titrable alkalinity of the blood. It is titrated with decinormal acid against Töpfer's reagent (dimethylamidoazobenzene), and also against phenolphthalein. He finds that blood serum may readily be neutral or acid during an acidosis, whereas under the same conditions all normal sera are strongly alkaline. The less severe grades of diminished alkalinity can be detected in a qualitative

way from the behaviour of sera before and after the removal of protein, and by the selection of a solvent such as alcohol. Definite changes in the titratable alkalinity occur in experimental and spontaneous acidosis in certain renal conditions, and in some anæmias. The method may be used to afford information which can help to differentiate between the obscure comas. In diabetes it may happen that the titratable alkalinity may be decreased and the tolerance to bases increased.

Tuberculosis.—The question of the detection of bacilli in the blood-stream has been burdened with numerous papers during the past year. Some of the work is experimental. Marmorek[69] finds that the bacilli appear in the blood at times, varying according to the site of infection. Klemperer[70] was not so successful. In human tuberculosis the reports are also variable. Storath[71] never finds the bacilli in the blood so long as the patient is afebrile. Nobécourt and Darré,[72] working with children, found the bacilli only in four out of thirty-five cases. Kachel[73] met with a similar experience. Baetge[74] decided that there is no clinical value at all in the search for bacilli in the blood in tuberculosis. There are far more convenient methods of making a correct diagnosis.

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BLOOD-PRESSURE.

High tension treated by **Diathermy** (*p.* 71). **Papaverine** said to be useful (*p.* 24).

BLOOD, SEROLOGY OF. *O. C. Gruner, M.D.*

The year has seen the appearance of numerous publications upon the *Abderhalden Reaction for Pregnancy and Carcinoma.* This is partly the result of one or two adverse criticizers coming forward, and being followed by others who agree with their negative findings. It is difficult to judge impartially between the two factions, because the issue is obscured by the renown of the originator of the test. In a matter of this kind, however, there can be but one real issue, namely, the question whether the test is or is not of any value to the patient. He wishes to have his ailment diagnosed as early and as accurately as the highest skill of medicine allows; to submit to no more than is necessary for the purpose; and to have the evidence obtained at a reasonable expense. Using these few criteria we find that (1) While hitherto the reaction has claimed absolute accuracy, several observers, among whom Leitch may be singled out because of the very careful report which he has furnished, now deny even a reasonable specificity to the test. (2) It is true that the material for the test is obtained without any inconvenience to the patient; but (3) It can be satisfactorily executed only by a laboratory specialist, and at some expense. The result is that we must take particular notice about the claims to *accuracy*; everything will stand or fall by them.

As a clinical pathologist, in the sense of seeking to determine the functional activities of the various organs by laboratory methods, one has to admit that up to the present there is no single test that can be utilized as of final importance in showing the degree of functional activity of any organ. This is shown between the lines in other paragraphs. (*See* LIVER FUNCTION, TESTS OF, *and* PANCREATIC EFFICIENCY). The organs are all too interdependent to allow 'absolute' tests any serious significance, and the provision of glandular tissue of

all kinds is sufficiently large to result in masking the functional derangement up to a point at which other signs will appear, and provide the necessary clue to diagnosis (it may be noted that it is in connection with problems of prognosis that clinical pathology may find its right place). This limitation was recognized by Cammidge[1] in regard to his pancreatic reaction, and it will have to be recognized in regard to the Abderhalden reaction.

In replies to his critics, Abderhalden[2] has attempted to put off the adverse results of other observers by stating that their technique was faulty in one way or another. The answer to this, from the patient's point of view, is that if a test is so delicate and so intricate that a 'pilgrimage to its inventor' (to borrow from Leitch)[3] is necessary to ensure its correct execution, it may be practically disregarded altogether. In any case the patient may be hundreds of miles from a laboratory (e.g., in Canada).

A few words about the evidence in support of the test. The most important studies are those in relation to the test for pregnancy, because the diagnosis is readily verified. Echols[4] admits that every pregnant woman does not give the Abderhalden reaction, but he uses it in a negative sense: no reaction, no pregnancy. Schiff[5] instances a case of negative reaction in ectopic gestation as in support of the reaction, because the fœtus proved to be dead. He speaks in favour of the test altogether: "every case of pregnancy gave a positive reaction." Krupsky,[6] Pollitzer,[7] Schwartz,[8] Holdt,[9] Goodman,[10] and Papendieck[11] accept it unreservedly. In regard to the test for carcinoma, Lampe,[12] Erpicum,[13] Ssokolow,[14] Matzkiewitsch[15] obtain satisfactory results. Erpicum, in particular, enlarges on the fallacies, and the need to 'explain away' failures. The 'favourable' evidence may be said to consist in obtaining a positive result in more than 50 per cent of cases, judging by the statistics afforded by these various observers. Crudely, there is just less than an even chance that the test will fail or succeed in any individual.

On the other side are papers by Bacon,[9] Falls,[9] Flatow,[16] Fränkel,[17] Lange,[18] Leitch,[3] Lichtenstein,[19] Meyer-Betz (with others),[20] and Williams.[9] Falls obtained a positive reaction for pregnancy in 12 per cent of normal people. Flatow is a strong German opponent of the test, on the ground that there are no specific protective ferments. He believes that there is merely a difference in degree of ferment activity in the serum, and that it is sometimes (not constantly) increased during pregnancy and in cancer cases. Leitch affords evidence in support of the opinion of some English bio-chemists, that the whole of the work on protective ferments is an instance of self-deception in medicine. He gives a good explanation of the history of the subject, which affords food for reflection upon the lengths to which fallacy upon fallacy, with premature publication, can go. Meyer-Betz and others have demonstrated pregnancy in male patients by the use of this test—a finding which is also explained away by the supporters! We may conclude, therefore, that the presence of cancer, or any other

disease to which the test has been applied (tuberculosis, Krym,[21] Gumpertz[22]) cannot be established with certainty by its means.

Of other serological tests for these diseases, Kelling[23] has worked with the *meiostagmin reaction*, and reports favourably when the results are "read in conjunction with the clinical evidence." Similarly Roosen and Blumenthal,[24] Arzt and Zarzycki.[25] Ishinara[26] obtained satisfactory results in experimental animals. Mioni[27] finds the *antitryptic index* increased in 91 per cent of cases of cancer. Fried[28] finds the *v. Dungern serum reaction* of no value, while Hara[29] obtained 90 per cent of successes. Josza and Tokeoka[30] obtained positive results in 81·5 per cent with the *epiphanin reaction*, but some non-cancer cases gave a positive reaction.

Complement Fixation.—Garbat[31] draws attention to the use of the complement-fixation test in *typhoid fever* as compared with the agglutination reaction. He points out that the latter is rapidly losing its importance, owing to the frequency with which prophylactic vaccination is now performed, thus rendering the patient's serum strongly agglutinating. His results show that practically all patients develop antibodies recognizable by the complement fixation method. They are specially numerous during convalescence. When a blood-culture is negative, a positive complement fixation test often throws useful corroborative light upon a doubtful agglutination serum test. Incidentally, it is shown that a polyvalent antigen should be used for the test, which proves that a polyvalent vaccine (which is the therapeutic name of the antigen) should be employed in prophylactic treatment.

Similarly, the importance of a polyvalent tuberculin for the com plement fixation test for *tuberculosis* is referred to by Wwedensky.[32] The highest percentage of positive results was obtained in cases of chronic bone and joint infection. The value of the test is not impaired by a previous von Pirquet. The method will not differentiate between different strains of the tubercle bacillus. McIntosh, Fildes, and Radcliffe[33] speak favourably of this diagnostic method as indicating the presence of active tubercle. Hitherto there has been the difficulty of deciding between an active lesion and a merely tuberculous habit.

Debré and Paraf[34] employ the complement-fixation method with urine, and with pleural and ascitic fluid. It may come off with the urine from a tuberculous kidney and not from its healthy fellow. They do not get positive results with the serum or cerebrospinal fluid. These authors only applied the test to the fluids named, finding it of value in tuberculous disease of the urinary tract, and the pleural and abdominal cavities.

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BONE, SARCOMA OF.

X-ray treatment found useful in certain types (*p.* 63). **Radium** used successfully in one case (*p.* 69).

BONE, SURGICAL AFFECTIONS OF. (*See also* AMPUTATIONS.)

F. W. Goyder, F.R.C.S.

Osteomyelitis.—Williams[1] draws attention to a somewhat unusual form of osteomyelitis, apparently commoner in the adult, and often secondary to septic lung conditions or pustular skin infections. He concludes that infection of bone is primarily of the marrow ; hence the medullary canal should be explored in all cases in which *x* rays do not give evidence to the contrary. In adults the localization of the infection is in the middle of the shaft rather than at the end of the bone, and infective osteomyelitis may be subacute in character, and suggest sarcoma rather than infection in its clinical features.

Broca[2] has met with a few cases of *acute osteomyelitis of the upper jaw in the new-born*, a rare condition. It is frequently confused with purulent ophthalmia, with erysipelas, and with empyema of the maxillary antrum. The last condition may occur secondarily, but owing to its small size, rarely as a primary condition in infancy. A few cases have also been ascribed to tubercle. The author regards the condition as a hæmatogenous osteomyelitis affecting the dental follicles, especially of the temporary molars of the upper jaw. Early surgical intervention is important to limit the spread of the disease. An incision should be made on the alveolar border, the posterior part of the maxilla curetted, and the dental germs extracted. A fistula below the orbit should be scraped if it exists, and drained into the mouth. Recovery after these measures occurs in about half the cases.

In cases of chronic osteomyelitis, Seton Pringle[3] advises radical operation, whether one or more sinuses have been discharging for months or years after an acute attack, or whether recurrent abscesses occur. He aims at removing all diseased bone, and leaving no hard-walled cavity behind. Advantage is taken of the fact that there is in most cases one surface of the bone not involved in the inflammatory process. In the tibia, as a rule, the external or fibular surface is not perforated by cloacæ ; in the forearm or leg there should be no hesitation in removing the entire circumference subperiosteally. Suppuration of course continues for a few weeks, but rapid healing occurs, and regeneration of bone proceeds quickly. Eleven out of twelve cases treated were successful. (*Plate XII.*)

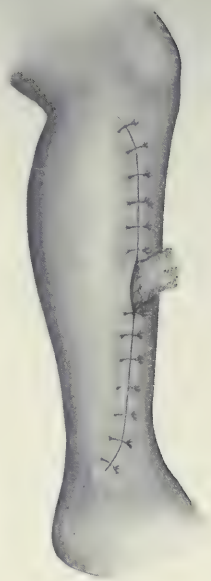
Bond[4] shows that the fibula can be used successfully for trans-

PLATE XII.

OSTEOMYELITIS: SETON PRINGLE'S OPERATION

A.

B.



C.

Shows diagrammatically: (*A*) Soft parts, including periosteum, raised of the bone; (*B*) Diseased bone removed: (*C*) Operation completed, wtih gauze plug protruding.

Illustrations kindly lent by "British Journal of Surgery."

PLATE XIII.

OSTEOMYELITIS: BOND'S METHOD OF BONE-GRAFTING

A. *B.* *C.*

Radiograms showing: *(A)* Patient before operation; *(B)* After operation; *(C)* Condition five years after operation.

Illustrations kindly lent by "British Journal of Surgery."

planting into the gap left after removal of the tibia for osteomyelitis. It should be noted that the vascular supply is left uninjured, which may account for the much better result obtained by Bond than by other experimenters with this bone. Its weight-bearing capacities become excellent owing to its growth in thickness when fixed above and below into the tibial stumps ; the only disadvantage appears to be the inevitable shortening of the limb, and the possibility of diminished growth owing to epiphysial damage at the time of the original inflammation. A two-stage operation is employed, an interval of about two months intervening (*Plate XIII*). Bond thinks that the controlling factor directing the growth and development of transplanted bone, causing it to take on the size and shape of the tibial shaft, are the osteoblasts of the tibial epiphyses. There is a great tendency for epiphyses to link themselves up with diaphysial bone. A diaphysis seems to be essential to the proper development of all epiphyses. Growth in the transplanted bone depends upon whether or not it comes under the active influence of osteoblasts from some growing area of the bone which it partially replaces.

Rutherford Morison[5] describes cases showing the principles of growth and repair in bone. Particularly successful was a tibial graft put into the opposite leg to replace the tibia removed two years previously for tuberculosis. A fibular graft to fill the gap left by the removal of a chondrosarcoma of the humeral shaft was less successful owing to subsequent lack of growth of the transplant. This Morison attributed to the use of the fibula ; but Bond[4] believed to be due to the imperfect fixation of the upper end.

A good result is reported six years and a half after simple curetting for myeloma of the upper end of the tibia ; also of excision of the lower end of the humerus three months after backward dislocation at the elbow-joint.

Bone-grafting.—Deformities of the *phalanges* (*see also* AMPUTATIONS) resulting from acute and chronic osteomyelitis of the suppurative and tuberculous types from syphilis, especially in children, and from tumours both innocent and malignant, can be greatly improved by bone-grafting. In tuberculous dactylitis good results follow even if sinuses are present. Living bone from the same individual, especially if covered with periosteum, is the most satisfactory material for the grafts. Wolff[6] substituted the whole first phalanx of the second toe for a basal tuberculous phalanx of the fourth finger, with a good result and a movable joint. Haas[6] in similar cases leaves the distal end of the diseased phalanx, and replaces the removed portion by a piece of tibia covered by periosteum. In his cases union was good, but although new bone developed it did not appear to arise from the transplant.

Wenglowski,[7] to obviate the deformities produced by resection of bone for malignant tumours, advocates sterilization *in situ* of the affected bone, killing all the elements of the tumour and leaving the dead bone to act as a graft in its natural connection with the healthy

part. He performs this through the wound by means of steam at high pressure from a steam-kettle connected by means of a rubber tube with a perforated metal nozzle. A straight one with terminal holes is used for the exposed portion, and a curved one with holes on the concavity for the back of the tumour. The tumour is excised as far as the soft parts are concerned; as much as possible of its substance is scraped from the bone, which is laid bare completely as for a resection. The soft parts are protected with gauze covered by sterilized asbestos, and finally by a metal plate to guard the soft parts from the hot condensation water. Then the curved metal tube is passed under the bone and the steam turned on. From four to four and a half minutes suffice for the femur, three for the tibia, one and a half for the mandible, and eight for the femoral condyles. The temperature within the bone is 75° to 80° C., but at a distance of 2 cm. from the point of application it is only 45° to 50°, so that the nozzle has to be moved and sterilization effected bit by bit. No cases are described.

Mauclaire[8] advises against conservative surgery in malignant tumours of bone except in the case of myeloma, because of the frequency of recurrence. Where amputation is refused, he performs resection of the affected portion of bone rather than scraping. Dealing with the bony gap thus produced, if it is central, he employs a bone graft with good results. Where one surface of a joint has to be removed, although admitting that good results have followed from engrafting the corresponding portion taken from a simultaneous amputation, or even from a corpse recently dead, he has not attempted the operation. As cartilage-covered bone was not to be obtained, in the case of myeloma of the head of the tibia, after resection of the diseased portion, he implanted the tibial stump between the femoral condyles, producing a stiff joint with three inches of shortening. Similarly, after removing the lower end of the femur, Mickulicz implanted the stump into a hole bored in the tibial epiphysis. Good results followed in both cases.

Katzenstein[9] regards bone-transplantation as a commonly successful procedure. In many cases it prevents amputation and preserves a limb, often restoring function to one previously useless. He advises autoplastic periosteum-covered bone grafts. Implantation of a tibial graft into the space left by removal of a tuberculous metacarpal, and of a whole phalanx of the great toe for a tuberculous-metacarpal bone of the thumb, gave good results both as regarded function and mobility. A 'myelogenous fibrosarcoma' of the tibia was resected, and the gap filled by a graft from the opposite tibia. Five years later the result was good, and there was no recurrence. A spontaneous fracture through a cyst in the shaft of the femur treated by excising the fibula, dividing it in two, and wedging the ends into the medullary cavity at the seat of fracture, resulted in good ultimate union. The fibula was also used to bridge a pseudarthrosis secondary to fracture of the neck of the femur: the patient became able to walk without

limp or support. For knock-knee due to destruction of bone on the outer side of the upper end of the tibia, a wedge-shaped bone-graft inserted on the outer side below the defect corrected the deformity.

Albee,[10] reporting the results of autogenous bone grafts in 250 cases, comes to the following conclusions: (1) Bone removed with its periosteum and 'endosteum' placed in contact with bone unites in 100 per cent of cases; (2) Endosteum, marrow substance, and periosteum are essentials, since they aid in establishing an early and sufficient blood supply to the cortical portion of the graft. The endosteum is actively osteogenetic in function. (3) Small bone-grafts without periosteum, in addition to the main one, help union because blood gets an easy access to their osteoblasts. (4) The living bone-graft has bacteria-resisting properties. (5) It acts as a stimulus to osteogenesis to the bone into which it is engrafted. (6) An immediate formation of new tissue fixes the graft to the recipient bone, and the new tissue changes to solid bone in four weeks. Hence a bone-graft is always to be preferred to a solid metal internal splint. (7) The dowel, inlay, and wedge bone-grafts afford a means of repairing and remodelling the skeleton which the surgeon has not hitherto possessed. Albee is a strong advocate of motor saws, especially the twin circular saw, which he uses extensively in cutting the inlay grafts. His grafts have been proved to be permanent up to three years. Apart from spinal caries (q.v.) he uses bone-grafts in the treatment of club-foot, recent and ununited fractures, paralytic foot deformities, spina bifida, and congenital and paralytic dislocation of the hip. These will be found described under their appropriate headings. He also uses osteocartilaginous grafts for joints.

Under the title of *traumatic epiphysitis dissecans of adolescents*, Ebbinghaus[11] describes a condition of the tibia which he regards as due to excessive athletic effort, particularly in long jumping, hill-climbing, and football. Schlatter regards it as a traumatic wrenching or squeezing of the upper tibial epiphysis. Ebbinghaus thinks that constant strain gives rise to chronic irritation, and hence inflammation at the epiphysial junction at the tibial spine. A sudden additional strain may then give rise to partial separation. There seems to be little tendency to natural recovery for a considerable time. Operative interference undoubtedly hastens cure. The symptoms are persistent pain in the knee, a slight limp, a 'slack' walk, movements at the joint during walking being slightly diminished. The patient easily tires on exertion. The condition develops slowly, and tends to get progressively worse. On examination, there is painful thickening on each side of the tubercle of the tibia, and at times slight effusion. The condition is not easily distinguishable from tubercle; *x*-ray examination clears up the diagnosis. The operation recommended consists in a vertical incision exposing the tubercle. The insertion of the patellar ligament is laid bare, its fibres are split vertically and retracted, and the bone projection is chiselled off up to the frontal fold of the capsule of the knee-joint. Any fluid in the joint may be

let out at the same time. The tendon is reattached to the bare cartilaginous surface remaining. The knee is fixed in plaster in a position of extension. Walking is allowed in a fortnight. The patient is kept under observation until, with the thigh at right angles to the body, he can voluntarily straighten the knee completely. No complications have resulted from this procedure, and the results are satisfactory.

A somewhat analogous condition occurring usually under the articular cartilage of the femoral condyles, and more rarely of the tibia, is described by Ridlon[12] under the title of *osteochondritis dissecans*. The condition generally arises after puberty. The knee becomes enlarged, and *x*-ray examination shows loose pieces of bone, either under the articular cartilage or free in the joint. Locking and disability occur only in the latter class, which is apparently a later stage. The condition has also been investigated by Freiberg and Koenig, the former of whom says that it must be distinguished from arthritis deformans and osteo-arthritis, both of which may also give rise to loose bodies, often in large numbers, unlike osteochondritis. Operation is the ideal treatment in these cases ; but in the early stage, disability is so slight that Ridlon's three patients refused it. A diagnosis can only be made by *x* rays. The after-history of Ridlon's cases shows that the condition is not always progressive.

Skillern,[13] judging from a case which he describes, regards *fibrous osteitis* as due to congenital syphilis. A youth, age 14, owing to pain in his thigh, noticed that it was swollen and bowed. Two years later he sustained a fracture in the region of the swelling. After thirteen weeks' treatment he was able to walk, but the bowing, though not the swelling, had increased. Two years after the fracture, he applied for treatment owing to pain on walking and 2½ in. shortening. Wassermann's reaction was positive. An ambulatory brace was applied to transmit the weight of the body from the pelvis to the ground, and for eleven months vigorous antisyphilitic treatment was employed, including neosalvarsan twice weekly. As Wassermann's reaction became negative, and *x* rays showed more homogeneity of the texture of the bone, with complete healing of the line of fracture, osteotomy was advised.

Binet and Mutel[14] describe under the name '*radius curvus*' a condition which they ascribe to late rickets. It is usually bilateral. A dorsal curve of the radius takes place, which produces a secondary dislocation of the lower end of the ulna and progressive subluxation of the carpus. The deformity is severe and crippling, because use of the hand causes pain. They perform incomplete cuneiform osteotomy on the dorsum of the lower end of the radius. Forcible extension at the site of the osteotomy corrects the deformity, obviates the necessity for hyperextension at the wrist joint, and prevents subluxation. In early cases they advise fixation in plaster of the hand and forearm. Early treatment is advisable, because the condition, once established, rapidly progresses if work such as ironing is continued.

Another condition often ascribed to late rickets is the *coxa vara of adolescence*. Broca[15] protests against early surgical intervention in these cases. He points out that the condition, if untreated, is progressive, but that, although chronic, it comes to an end in adult life, leaving such deformity as is allowed to develop during the active period. Partial correction of this is possible in the early stages; but as a rule the patients can usually adapt themselves to any deformity remaining, and once the active period is over, deformity will not increase. He advocates rest in bed, with extension in the abducted position of the affected limb or limbs, for three or four months, after which the abductor muscles should be strengthened by massage, Swedish and other exercises, and faradization. All carrying of heavy weights and prolonged standing should be forbidden till adolescence is completed. After such a régime, operation is not required, though the author thinks that, if the remaining deformity is severe, subtrochanteric osteotomy is justifiable; he has not found it necessary, however, in the cases he has treated.

Bone Cysts.—Barrie and Hillman[16] are so impressed by the unsatisfactory terminology in bone diseases, that clinical and pathological investigations have made them reclassify these conditions, mostly under the heading of inflammatory lesions. They use the term *hæmorrhagic osteomyelitis* to embrace "a majority of those traumatic, localized, non-infective, non-suppurative, low-grade inflammatory lesions that have their onset in spongy bone." They describe two types: (1) Hæmorrhagic, showing little or no metaplastic change, and including the conditions formerly described as medullary giant-cell sarcoma, myelogenous giant-cell sarcoma, myeloma, and medullary giant-cell tumour (of Bloodgood), which they consider to be inflammatory and not neoplastic; (2) Fibrocystic osteomyelitis, which they regard as a sequel of the former type which may follow when there is later hyperplasia. As synonymous terms for this second group they include benign bone cyst, osteitis fibrosa, chronic osteomyelitis fibrosa—cystic or solid—and traumatic solitary bone cysts. They believe that the so-called medullary giant-cell sarcoma of bone is a localized regenerative inflammatory lesion, without evidence of malignancy; that, owing to the anatomical arrangement and structures involved, slight initial trauma is sufficient to account for the pathological phenomena and progressive bone destruction that occurs regardless of any infective process; the giant cells found in these lesions are neither tumour cells nor tissue builders. They act in the capacity of scavengers. The differentiation between lesions of this type and true tumour formation is as follows: (1) The heterogeneous cellular picture—fibroblasts, endothelial and polynuclear leucocytes, lymphocytes, and eosinophiles; (2) Tendency to the formation of hæmorrhagic granulation tissue; (3) The associated fibroblastic proliferation (regenerative); (4) The absence of definite evidences of rapid autonomous cell growth as indicated by the scarcity of mitotic figures; (5) The large number and character of giant cells present (foreign-body type).

Elmslie,[17] however, says "there is not at present sufficient evidence to decide definitely how bone cysts are actually formed. There does, however, seem to be evidence that they may be formed either as the result of the action of osteoclasts, or by degeneration and liquefaction in fibrous tissue. It must be confessed that the present state of our knowledge of the pathology of bones is not such as to enable us to classify properly these fibrocystic diseases. It would perhaps be better to state frankly that we cannot decide whether they are one disease or several; whether they are of the nature of inflammatory processes or new growths, or simply instances of disordered bone growth; and be content with a statement of clinical characteristics and their pathological characters so far as these have been ascertained. For this reason, the names—simple cyst, fibrous osteitis, fibrocystic osteitis, myeloid cyst—are all open to objection, inasmuch as they assume in some way or other that the nature of the process is understood. If we call the condition, or conditions, fibrocystic disease of the bones, we make no such assumption; and we fall in with the system which has been adopted in other organs in which obscure cystic changes occur."

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BRAIN, SURGERY OF.

E. W. Hey Groves, M.S., F.R.C.S.

CRANIAL INJURIES.

Gunshot Wounds.—At the present moment the question of the wounds of the head received in battle transcends all other subjects related to cerebral surgery. Although it is too early to draw conclusions from the present war, yet the main factors concerned may be advantageously reviewed, because these are sufficiently well known from experiences in the late Balkan wars. Thus more than a year ago Billet,[1] from the French military hospital of Val-de-Grace, clearly set out the principles which ought to guide practice as follows: It has been calculated that of all who die on the field of battle about 55 per cent have been shot through the head; but on the other hand, of those who receive such wounds which are not immediately fatal, only about 20 per cent die subsequently. Among cases which survive, there are only two varieties, as regards the cause of the wound. These are those caused by rifle bullets and those by shrapnel shell. All cases in which the shell itself strikes the head are fatal, and in many of them the victim is decapitated. The distinction between bullet and shrapnel wounds is on the whole well marked. The former are small and aseptic, whereas the latter are large, ragged, and septic. This difference is brought about by the low velocity as

well as by the round shape and greater size of the shrapnel ball as compared with the conical bullet.

It may be said that there are three different views in relation to the necessity for *early operation* upon these cases. According to one, it should be performed as a routine measure for all cases in which the skull has been penetrated; according to the opposite view, none should be operated upon unless there are clear indications of grave or increasing cerebral mischief; and according to the third view, which is that most generally held, it is better to avoid both extremes, and select the cases requiring operation according to certain general indications.

The advocacy of routine operation depends upon the fact that there is always some splintering of the inner table of the skull in penetrating wounds, and that the fragments of bone ought to be removed without waiting for them to cause pressure or irritation.

On the other hand, the method of routine abstention from operation has much in its favour. Thus, in the majority of high-velocity bullet wounds, the splintering of the bone is only slight, and the minute aseptic fragments do no harm. Operation on these cases not only risks sepsis, but there is a further trauma to the already damaged brain.

We are therefore forced to adopt the third alternative of being guided by the circumstances in each case as to the necessity or not of immediate operation. These determining circumstances may be considered under the following headings:—

Hæmorrhage.—Severe and progressive intracranial hæmorrhage is rare, and associated more frequently with shell wounds causing fracture than with perforating bullet wounds. The bleeding is usually from the middle meningeal artery or from one of the great venous sinuses. Such hæmorrhage demands immediate operation directly it is recognized. A large trephine opening is to be made, and the wounded artery tied or the torn sinus plugged.

Perforating Bullet Wounds.—When a rifle bullet has gone right through the head, the wound of entry is small, the outer table of the skull cleanly cut, the inner splintered, whilst the exit wound presents the converse conditions. It is about such a case that there may be most room for doubt as to the advisability of trephining. Billet quotes Holbeck's figures from the Russo-Japanese War as evidence that mere cleansing of the surface wounds gives as good results as trephining. These figures, which only deal with 22 cases of perforating bullet wounds of the head, show that, in 10 which were trephined and in 12 which were not operated upon, recovery took place in all, with exactly the same final result, healing usually being complete at the end of fifteen days.

Penetrating Bullet Wounds, the Bullet remaining in the Head.—Theoretically it is always desirable to remove the bullet, but the feasibility of this must depend upon the position of the missile in the head. Practically it is only to be removed when it lies close to the skull in

some accessible situation. Sometimes it lodges quite near the wound of entrance, through which it can be extracted. In other cases it has traversed the brain and lies close beneath the skull on the side of the head opposite to the wound. In this event, if the *x* rays make the position quite clear, and if the bullet is at the side or vault of the cranium, then, too, it should be removed. When it is at the base of the skull it is better left. *Plates XIV* and *XV*, from cases in the present war,[2] give a good idea of the diagnosis by the *x* rays, of bullets lodged in the cranium, and typical positions from which they can be extracted.

Tangential Gunshot Wounds.—From the point of view of treatment, these are much the most important of all the gunshot wounds of the head. They form the majority of the cases of head wounds which are brought into the base hospitals. The projectile has struck the cranium tangentially and ploughed a veritable gutter fracture through the skull. The scalp is lacerated and contused, a type of wound which is invariably septic. The outer table may be merely fissured, but the inner table is always much comminuted, the particles of bone being driven more or less deeply into the membranes and the brain. The brain itself is lacerated, its coverings torn, and upon its surface lies a blood clot with foreign bodies and particles of bone which readily favour septic development. Such a wound must always be freely and thoroughly opened up and cleansed at the earliest possible moment. There is ample evidence, from experience as well as from theoretical considerations, that this early operative intervention gives much better results than an expectant policy. It may be said that the former method will save all cases in which the brain is not fatally injured, whereas the latter leads to death from cerebral sepsis in 20 per cent of the cases.

Shrapnel Wounds.—If shrapnel bullets cause perforating or tangential wounds, the treatment is the same as described above. But owing to its low velocity and greater bulk, the shrapnel ball causes wounds which have two features unusual in bullet wounds. First, they frequently cause extensive fracture of the skull. This fracture, being both open and depressed, with much internal splintering, usually requires to be trephined for the purpose of removing the bone spicules. Secondly, the projectile very frequently lodges near the large wound of entry, through which it should be extracted.

A last word is added to the above considerations determining the necessity of immediate operation, and that is, that no patient should be subjected to operation until he has been taken to some station where he can be kept for at least fifteen days afterwards. Nothing but the gravest emergency, e.g., obvious intracranial hæmorrhage, justifies the trephining of a patient and within a few days placing him on a transport train or ship.

Secondary Operations.—These include late operations done for septic complications or for the relief of cerebral compression. Sepsis

PLATE XIV.

BULLET IN THE TENTORIUM CEREBELLI

Notice the large clear space above caused by the bone of the skull having been blown away. Bullet removed by operation. The patient made a good recovery.
(Capt. Herschel Harris)

Plates XIV and XV are kindly lent by the "British Journal of Surgery."

PLATE XV.

BULLET IN THE PETROUS PORTION OF THE TEMPORAL BONE

The point of the bullet has been deflected by impact with the bone. Treated by a temporal decompression. Bullet left *in situ*. Good recovery.

BULLET LYING ON THE TENTORIUM CEREBELLI

Bullet entered left parietal region. Patient had marked cerebral compression. Decompressive operation done on left side, clot and bone débris removed. Bullet removed at a later operation by a trephine opening in the right occipital region. Good recovery.

(*Capt. Herschel Harris*)

is the underlying factor which necessitates nearly 60 per cent of these secondary operations, and it is chiefly responsible for death in all those who are not killed outright. That sepsis is the chief element in prognosis is shown by the fact that the mortality among aseptic cases is 1·7 per cent, that among septic cases 41·8 per cent. Unfortunately, late sepsis usually takes the form of a diffuse meningo-encephalitis which, if untreated, is invariably fatal. Therefore, whenever signs of this complication make their appearance, the skull should be freely opened without delay. An abscess in or upon the brain is the next most frequent complication. This is almost always at the seat of the wound or contusion, and therefore easily found and drained. Hernia cerebri occurs with great frequency, and is another manifestation of intracranial sepsis with inflammatory œdema. To some extent it may be prevented by making the operation openings into the skull large, and allowing ample drainage. After it has occurred, it should not be excised, but treated by a light alkaline or formol dressing.

Late Complications.—Of these, insanity and epilepsy are the most important. In 65 cases followed up by Holbeck after the Russo-Japanese War, nine died within two years of their injury from some late cerebral complication. Holbeck's figures do not give any encouragement to immediate trephining as a preventive of epilepsy. Of 19 cases of Jacksonian epilepsy, 12 had been trephined and 7 had not. These figures are too small to base any very definite opinion upon, and it must be borne in mind that the cases for which trephining was done were probably more severe wounds than the others.

Depressed Fracture of the Cranial Vault.—Barry,[3] writing from Burmah, has had a large experience of these injuries, because homicidal assaults are so very common there. In 123 patients who had had their heads beaten in, 22 died, a mortality of 18 per cent. Of these fatal cases, 16 died as an immediate result of the injury to the brain, 4 of septic encephalitis, and 1 of tetanus. This mortality compares very favourably with the results obtained at the same hospital in former years (prior to 1899), when it was 34 per cent. These improved results are attributed by the author, not to any alteration in the selection of cases for operation or in the character of the operation, but to the greater care taken in late years in the preparatory cleansing of the wound. All the contused edges are cut away cleanly and the parts painted with iodine. In every case of depressed fracture the skull must be trephined in order to remove the splintered fragment of the inner table. As regards prognosis, the chief elements are the degree of coma and the injury to the dura mater. Of patients with lasting and complete unconsciousness, 85 per cent died. Cases in which the dura was intact gave a mortality of only 5 per cent, whilst those in which it was injured died at the rate of 43 per cent.

The Treatment of Fractured Base.—The most difficult and important point about the treatment of severe cases of fractured base is the question of operating for the relief of prolonged coma. Bérard does not hesitate to lay down clear rules on this point. According

to him, every severe case of head injury should be immediately subjected to lumbar puncture, not more than 30 c.c. being drawn off. If relief from this is only temporary, then free bilateral temporal decompression should be done, or, failing this, the lumbar puncture should be repeated. Anderson, on the other hand, deprecates the frequent resort to trephining for fractured base, and claims that lumbar puncture gives as good results as decompression.

Diagnosis of Cranial Fracture.—Luckett and Stewart, among other workers, urge the more systematic use of the *x* rays. They give careful directions for technique, such as the manner of fixation of the head during exposure. A number of good skiagrams illustrate their article, and serve to show how fracture of the cranial vault can often be detected by this means which otherwise give no evidence of their presence. But it may be remarked that it is in the fractures of the base that most difficulty of diagnosis exists, and it is here that the method fails.

The Filling in of Cranial Defects.—The present methods of extensive craniectomy, and also the great loss of substance attending gunshot wounds, call for some well-attested plan for repairing large gaps in the cranial wall. All sorts of devices have given good results as judged from published cases; but in this matter, as in so many others, we are too much in the dark as regards failures. In the first place are those methods which use the skull itself: either the trephined circle or the large fragments of bone removed. Undoubtedly, when possible, this is the best method. Or a plastic operation may be performed by which an osteo-cutaneous flap of skull is turned over the gap so as partly to cover it in. This is open to the great objection that the residual defect in the skull wall is as great after, as before the operation. The application of plates consisting of gold, silver, aluminium, horn, or celluloid is easy, and devoid of any risk other than that of failure. The plate should be freely fenestrated. Probably horn is the best material, because it becomes incorporated with the connective tissues. Another type of operation consists in the grafting of flaps of fascia lata into the gap, and this has given such good results that it may be regarded at the present moment as holding the field of surgical favour. It is especially suitable for those cases where there has been extensive loss of dura mater as well as of bone, and where it is undesirable to close the cranial cavity too rigidly, on account of cerebral compression. Lastly, there is the method of taking bone and fascial grafts from other parts of the body.

Mauclaire,[4] after reviewing these various methods, relates his own experiences with the last. He has utilized the lower angle of the scapula, the great trochanter, and the tuberosity from the crest of the ilium, with varying degrees of success.

Traumatic Sensory Aphasia.—This very rare phenomenon is described by Cope,[5] who has collected five cases from the literature and added one of his own. The lesion consists in a contusion, with hæmorrhage of the left parieto-occipital region brought about by

contre-coup rather than by a definite direct fracture. His case was that of a girl of 14 who had fallen, striking the left side of the back of her head. She was dazed, and though she seemed to understand, she could only speak by uttering one name. She could write, but not sensibly; she could not copy letters. The skull was trephined two inches above the left ear and the opening extended backwards. The dura bulged outwards, and there was a clot in the parieto-occipital region, which was removed. She made a good recovery of speech and writing within one week of the operation.

Intracranial Hæmorrhage in the New-born.—This occurrence is of much greater importance than is usually recognized. Not only does it cause many deaths attributed to 'convulsions,' etc., but it probably leads often to idiocy or to Little's disease, in the cases which survive. Green[6] urges its importance, and points out how readily its existence may be overlooked. The only symptoms may consist in pallor, facial œdema, and refusal to feed, or there may be the more typical coma and convulsions. Diagnosis may be made readily by puncture of the lumbar spine or, better, of the fontanelles, away from the mid-line. He relates 17 cases, in 7 of which life was saved by timely craniectomy. The open fontanelles and the thin bones make the operation easy, and it can be quickly performed.

DISEASES OF THE BRAIN.

Cerebral Treatment of Spastic Paralysis.—Of late years much attention has been paid to the treatment of spastic paralysis of cerebral origin by operations upon the spinal or peripheral nerves. Sharpe and Farrell[7] make a most interesting suggestion, substantiated by some few cases, of attacking this disease at its seat of origin. The type of case suitable is that of Little's disease, in which a marked increase of intracranial tension is shown by retinal examination. In such cases a free sub-temporal decompression is carried out on the right side, and a month later on the left. If any cysts or clots are encountered, these are removed. Details given of 2 cases, with references to 12 others, go to show that the result of the operation is a great improvement of the mental condition, with a diminution of spasticity and increase of voluntary movement.

Tumours of the Brain.—This subject was dealt with fully last year. Thorburn[8] summarizes the results of surgical treatment in 490 cases, including 57 of his own, as follows: 38 per cent died within a month; 28 per cent more within a year; 24 per cent survive for a year or longer. He considers that the chief aim of surgical treatment should be palliative. Among some of the most remarkable of recently recorded cases of successful diagnosis and treatment, are those of Oppenheim and Borchardt[9] and Oppenheim and Krause.[10] The former describe two cases of cerebellar tumour in young patients (aged nineteen years and seven years) successfully removed, with good recovery. The latter record the case of a sarcoma of the optic thalamus, which measured $8 \times 6 \times 5$ cm. after removal. The patient

was a woman, aged twenty-four, who had slowly increasing right hemiparesis, slight right hemihypæsthesia, right hemianopsia, and right facial paresis. She recovered from the operation.

Spiller[11] discusses the reasons for the failure and disappointment which so often follow operations for the relief of cerebral tumours. He shows that in many cases there is a diffuse hyperplasia of the brain substance, consisting in a general overgrowth of neuroglia, as well as the local tumour.

Pituitary Tumours.—Frazier[12] contributes an article on this subject, in which he collects and analyzes the facts relating to 74 cases. The pathology of these was as follows: Simple hyperplasia 2, tubercle 14, adenoma 22, carcinoma 6, sarcoma 10, cysts 11, and unclassified or indeterminate 9. The only symptoms which justify operation are severe headache and increasing blindness associated with acromegaly. Acromegaly alone does not justify operation. He urges the advantages of the frontal approach. A large osteoplastic frontal flap is turned back, the frontal sinuses being avoided; and the supra-orbital ridge and roof are temporarily removed. Four successful cases are recorded. Judging from Frazier's own pictures, the exposure of the pituitary body by this method is not free enough to justify the very extensive operation, and it is unlikely at present that the methods of approach through the nose or lateral wall of the orbit will be displaced by it.

Hydrocephalus.—Pussep[13] has carefully worked out a method of treating internal hydrocephalus which promises to give good results. He introduces a silver tube into the lateral ventricle, and this drains both into the subarachnoid and the subcutaneous tissues. It is left in place permanently, or removed after several months. He gives details of 20 cases, 14 of which are those of chronic hydrocephalus in infants, and most of the rest, secondary to tumours. Frazier,[14] too, advocates the puncture of the ventricle through the corpus callosum (Balkenstich) as the best method of relieving increased cerebral tension in cases of cerebral tumour. He shows how the accumulation of cerebrospinal fluid in the brain is the most important factor in the increase of pressure, and that this is due chiefly to an obstruction to the venous circulation in the choroidal plexus. Therefore it is more rational to drain the ventricles than to do external decompressive operations for the relief of cerebral tumours.

REFERENCES.—[1]Billet, *Caducée*, Paris, 1913, xiii, 271; [2]*Brit. Jour. Surg.* 1915, ii, No. 7; [3]*Ind. Med. Gaz.* 1913, Dec. 458; [4]*Arch. Gén. de Chir.* 1914, viii, 302; [5]*Brit. Jour. Surg.* 1914; [6]*Boston Med. and Surg. Jour.* 1914, clxx, 682; [7]*Jour. Amer. Med. Assoc.* Nov. 1913, 1982; [8]*Med. Chron.* Ap. 1914, p. 6; [9]*Berl. klin. Woch.* Nov. 1913, 2025; [10]*Berl. klin. Woch.* Dec. 1913, 2316; [11]*Amer. Jour. Med. Sci.* Jan. 1914, 29; [12]*Surg. Gyn. and Obst.* Dec. 1913, 724; [13]*Rev. de Chir.* Dec. 1913, 938; [14]*N.Y. Med. Jour.* 1914, 1275.

BREAST, CANCER OF. *K. W. Monsarrat, F.R.C.S.*

Halsted[1] writes on points in the technique of operation for breast cancer having for their object the prevention of fixation of the arm and avoidance of œdematous swelling. He considers that an incision

down the arm endangers the circulation of the axillary and subclavicular flaps; if necrosis occurs at their edges, infection will probably reach the space below the outer part of the clavicle in which the vessels lie. There is always some contraction of a scar down the arm, and when abduction is carried beyond 90°, this scar of skin and underlying connective tissue becomes taut and limits movement. In closing the wound, Halsted uses the skin above and to the outer side of the axilla to obliterate completely this subclavicular space, and stitches the edge of the skin to the first intercostal muscle at the highest point of the new axilla, and below this to the lower intercostal muscles around the wound edge. In this way he covers this space and the vessels without tension. What raw surface is left is covered with epithelial grafts which are carried right up to the apex of the axilla. While this part of the operation is being carried out, the arm is well abducted from the side. He recommends grafting rather than the formation of skin flaps, and for the following reasons. The surgeon remains free to remove a large area of skin without considering the difficulties of covering it; the grafts present a definite obstacle to the dissemination of carcinomatous metastases; recurrence in the deeper plane is at once noticeable under the thin grafted skin; if the inner wall of the axilla be covered with grafts to the apex of the axilla, the skin of the outer flap may be utilized, in redundant fashion, for covering the axillary vessels, for obliterating the subclavicular dead space, and for elevating the axillary fornix. Halsted has not experienced serious œdematous swelling of the arm since these modifications were employed.

Ritter[2] describes a case in which he removed both breasts for cystadenoma. Subsequently the axilla became affected with carcinoma, which recurred after removal. At the time of the original operation there was nothing in the breast tumours which suggested carcinoma microscopically. In seven other cases of cystadenoma he has found changes in axillary lymph-glands which he had previously considered characteristic of carcinoma. He concludes that although cystadenomata are usually benign, growth related to them may occur in lymph-glands, and behave as malignant disease; he therefore advises the removal of the regional glands in these cases.

Ruth[3] advocates the employment of the outer part of the great pectoral to cover the axillary vessels and nerves and prevent the formation of contracting cicatrix. He states that the "distal part of the pectoral used in this procedure has never been known to be secondarily involved in carcinoma." He points out that with the pectoral muscles intact it is impossible to collapse the axillary space, and under these conditions suppuration is favoured, and the amount and density of the cicatricial tissue increased. He cuts the great pectoral about a hand's breadth from its insertion, and sews it to the thoracic wall so as to cover the vessels.

Something of the same kind has also been suggested by J. B. Murphy. It is questionable whether the statement that the distal

part of the pectoral is never infected with cancer can be upheld. If the pectorals are removed, the next most important point in the avoidance of contracting cicatrix is a dry and clean wound. The worst cases of œdematous arm follow infection.

Gosset and Masson[4] write on the relation of cancer to cystic mastitis, based on a study of seventy-five cases of breast cancer. Cystic mastitis is the commonest disease of the breast. When the breast is affected with inflammation, obstruction of the ducts may occur from epithelial proliferation or connective tissue. Obliteration causes acinous dilatation, and this may end in cyst-formation or atrophy. Hyperplasia leads to projection into cysts. If it is chiefly of connective tissue a fibro-adenoma results; if it is epithelial, a dendritic adenoma is produced, and the cyst cavity is more or less filled with the leafed epithelial mass. This latter is intermediate between benign and malignant disease. In cystic disease these adenomatous lesions are very common; the authors believe that the sequence cystic mastitis—cancer is the rule and not the exception, and that this is the primary lesion in most cases of cancer. The inflammatory origin of this cystic mastitis is demonstrated. There is probably a long latent period between this condition and the development of clinically evident cancer. It is at the mastitis stage that operation is really effective, and cases in which the condition is present should at any rate have affected areas removed for microscopic examination.

Quénu[5] relates two cases in which involvement of the axillary glands was evident clinically before the breast tumour was definitely palpable. Delbet showed in 1888 that the involvement of the glands generally occurs at a very early stage of the disease. Quénu points out that growth in the axillary glands may precede the formation of a definite tumour in the breast itself. If, therefore, a patient presents herself with an axillary tumour, the breast should come under suspicion; and if the glands are cancerous it will be wise to remove the breast, even although no tumour can be definitely demonstrated clinically.

Bryan[6] relates a case of cancer of the breast in a boy, 15 years old, who, six months before operation, suffered a violent blow by a golf ball at the nipple. Five months later, while bathing, he noticed a little lump under and very close to the right nipple. When seen the tumour was about the size of a cherry stone, movable under the skin and on the underlying fascia. After removal, the pathological report stated that "the specimen is adenofibroma with distinct scirrhous carcinoma in scattered areas of rather active cell-proliferation."

Judd and Sistrunk[7] have reviewed the end-results of operations for cancer of the breast in St. Mary's Hospital, Rochester, from 1902 to 1912. The principle in the technique of all the radical operations was practically the same, and consisted in the removal of the entire breast, axillary glands and fascia, and pectoral muscles. In the evolution of the operation the tendency in late years has been to remove the subcutaneous and deep fascia more widely in all directions. If the supraclavicular glands were involved, no operation was performed.

When the lesion in the breast was in one of the upper quadrants and involved the skin, the supraclavicular region was dissected in some cases. In the cases in which this was done and the glands were found affected, the patients did not, as a rule, live three years ; but one was alive without recurrence after five years.

Accurate knowledge was forthcoming in 514 cases. Nearly all the younger patients who remained well were those who came for treatment early, before there was any evidence of extension to the lymphatics. There were 425 patients traced who had been operated on more than three years previous to the report. Of these, 234 had died, 191 were living ; of the latter 27 had recurrence. Of those dead, 19 were known to have died from other causes than cancer. The writers record several cases of late recurrence ; one patient died nine years after from general carcinosis, and one had internal metastases in the liver after six years and four months. There were several patients in whom both breasts were involved. If both were involved at the same time, the prognosis as a rule was bad. If one had been removed, and there was recurrence later in the other breast, the prognosis was often quite favourable. In 1905 a patient was operated on whose opposite breast had been removed in 1899. She lived four years and eight months after the second operation. The figures for patients operated on over ten years previously were as follows. Total, 50 ; traced, 40 ; dead, 27 ; alive, 13. That is to say, 32·5 per cent were alive, and none of these showed recurrence. The writers find that results of operation are improving, this being chiefly attributed to the fact that patients are coming earlier for treatment.

References.—[1]*Jour. Amer. Med. Assoc.* 1913, ii, 416 ; [2]*Monats. f. Geb. u. Gyn.* xxxvii, 679 ; [3]*Amer. Jour. Obst.* 1914, i, 80 ; [4]*Rev. de Gyn. et de Chir. Abdom.* 1913, xxi, 257 ; [5]*Bull. Méd.* 1913, xxvii, 1039 ; [6]*Surg. Gyn. and Obst.* 1914, i, 545 ; [7]*Ibid.* 289.

BREAST, DISEASES OF. *F. W. Goyder, F.R.C.S.*

Desmarest[1] advises the opening of *mammary abscess*, especially if situated in the lower quadrants, by means of a semicircular incision surrounding the lower half. He then separates the under surface of the gland from the subjacent muscular aponeurosis, localizes the abscess or abscesses accurately with the finger, and incises them on the deep aspect, breaking down septa between adjacent loculi of infection. He places two drainage tubes in the cavity, bringing them out through the most dependent part of the incision, the rest of which is sutured. He claims to be able to discover and drain small unsuspected abscesses. He condemns the radial incision as inefficient and unsightly, and obtains by his method a single incision for multiple abscess, correct drainage, an inconspicuous scar, and rapid healing.

Quénu,[2] describing the rare condition of *sporotrichosis* of the breast, points out that it may be confused with gumma, tuberculosis, or even with cancer. In some cases cysts occur. There are almost always additional foci of disease in other parts, the discovery of which is a

great help in diagnosis. Special methods are necessary to cultivate the organism. Iodide treatment is the most efficacious, with or without incision. The condition occurs most frequently in old age, and usually shows itself as a tumour, ill-defined and of slow growth.

Deaver[3] divides mammary *tuberculosis* into two classes. In a very few cases, a primary infection occurs through the nipple, or abrasions of the skin; the vast majority belong to the class of infection secondary to tubercle of lymph glands, of lungs, ribs and other bones, joints, and 'cold' abscesses. Operative interference gives good results; tuberculin, without operation, is unreliable. "Conservatism had better be expressed in limiting the area of excision, than in discarding operative treatment."

Greenough and Simmons[4] discuss the results of *conservative treatment for cystic disease of the breast*, from an analysis of 83 cases. They conclude that 20 per cent of partial operations are unsuccessful; in 4·8 per cent carcinoma occurred in the breast tissue left by the partial operation; in 5·9 per cent the disease recurred in the opposite breast; in 9·6 per cent in the breast tissue left by the first operation. Since carcinoma supervenes in about 10 per cent of cases of cystic disease, the whole of the gland tissue on the affected side ought to be removed, and local excision of nodules in the breast suspected of being malignant should never be done.

Lockwood[5] points out the importance of adequate operation for *breast cancer*. He performs removal of the nipple and areola, an area of skin over the tumour, the whole of the mammary gland, both pectoral muscles (including the clavicular head of the pectoralis major) with their fasciæ, the costocoracoid membrane, the fascia over all muscles bounding the axillary space, and all axillary fat, with vessels and glands, in all cases. In special cases it may be necessary to carry the dissection over the sternum, the abdomen, or into the posterior triangle of the neck. So-called recurrences in the opposite breast are often new primary formations; they occur in about 5 per cent of all cases of breast cancer. It is essential to remove the whole breast, since foci may be multiple, and any portion with signs of chronic irritation may become cancerous. Duct cancer is no less malignant than other types. Recurrences, especially in the axilla, are almost the rule after incomplete operations. Unless the pectorals and costocoracoid membrane are removed, the upper lymphatic glands cannot be dealt with properly; infected glands and lymphatic vessels may lie behind and above the axillary vein as well as below it. This vein should be fully cleaned, and small veins opening into it removed, to prevent secondary bone infection. In cases of incomplete removal, recurrences reach 70 per cent, and the mortality is as high as, or higher than, it is in complete operations. Incomplete operations are only successful when there are no infected lymph glands.

REFERENCES.—[1]*Presse Méd.* 1914, 505; [2]*Rev. de Chir.* 1914, i, 585; [3]*Amer. Jour. Med. Sci.* 1914, i, 157; [4]*Ann. Surg.* 1914, ii, 42; [5]*Brit. Med. Jour.* 1914, i, 1105.

BRONCHIAL GLANDS, ABSCESS OF. (*See* THORAX, SURGERY OF.)

BRONCHIAL GLANDS, TUBERCULOSIS OF.

J. J. Perkins, M.B., F.R.C.P.

DIAGNOSIS.—This receives further help, in Da Costa's[1] view, from the *percussion of the dorsal vertebræ.* D'Espine's well-known method of diagnosing its presence by the auscultation of the voice over the vertebral spines he finds to be inconstant in its results, though frequently positive. The percussion relationships of the vertebral column in the thoracic area in health are an upper zone of impaired resonance (due to the proximity of the cervical segment of the spine) over the first two or three spines, while below there is a uniform osteal resonance over the rest of the thoracic region. The changes induced by the presence of a mass of mediastinal glands may be twofold, the more frequent being a dull note on percussion if a mass lies close against the spine, damping its vibrations but remote from the great air-passages; such a mass, however, is excellent for the conduction of tone from the air-passages, and consequently, if it is intimately related to the trachea, all trace of dullness is lost, and the whole thoracic spine becomes extremely hyper-resonant. As a result, the thoracic spine may yield a hyper-resonant note, but much more frequently the mediastinal mass shows its existence by the presence of dullness, which, as Da Costa's diagrams show, may be continuous from the first to the fifth, sixth, or even as low as the eighth dorsal spine. As other of his cases show, the dullness may be broken, apparently always involving the first or first three dorsal spines, normally the site of impaired percussion, and reappearing below over the fifth, sixth, or seventh spine. Da Costa finds ordinary mediate finger percussion quite sufficient for the investigation of these signs, which are evidently of great value. In addition to vertebral dullness, zones of paravertebral impaired resonance in the interscapular region have been described; but the value of these has not yet been completely worked out. Enough, however, has been observed to prove that percussion of the spine is a valuable method of deciding on the presence of the enlarged bronchial gland whose existence is so much to the fore at the present time.

REFERENCE.—[1] *Amer. Jour. Med. Sci.*, 1913, ii, 660.

BRONCHIECTASIS. (*See* THORAX, SURGERY OF.)

BRONCHITIS. *J. J. Perkins, M.B., F.R.C.P.*

TREATMENT.—Wightwick[1] reports some satisfactory results from the use of **Vaccines.** The organisms found were in the first case a *pneumococcus* practically in pure culture, but with a good many *M. catarrhalis*; in the second, *Streptococcus mucosus, B. influenzæ, M. paratetragenus*; in the third, a pure culture of *M. paratetragenus.* The results in the first two cases were excellent, but in the third, which showed marked arteriosclerosis, improvement was slower. It should be noted that, although there was a history of chronic cough

and bronchitis in these cases, the condition which was so much benefited by vaccination was an acute exacerbation. The doses employed started with small amounts and were carried up to large numbers, e.g. 450 millions *M. catarrhalis*, with a view of obtaining powerful immunity.

Lemon recommends **Phosphorus** (*p.* 25) for acute and chronic cases. **Testi-iodyl** (*p.* 34).

REFERENCE.—[1]*Jour. Vaccine Therapy*, 1913, Sept.

BRONCHOSCOPY. *J. S. Fraser, M.B., F.R.C.S.*

Ingals and Friedberg[1] record the case of a man who inspired a band of gold that had been fitted around a last molar tooth. It lodged in the bronchus, going to the upper lobe of the right lung. The patient, who had suffered from severe bronchitis for several years, had four bronchiectatic abscesses after the accident. Ingals performed bronchoscopy under local anæsthesia, and found a large cicatrix in the position of the opening of the bronchus, and was unable to pass a probe to locate the foreign body. Later he repeated the bronchoscopy, aided by the fluoroscope, and was able to pass a pair of forceps through the stricture. He then moved the instrument about to assure himself that it was in the same opening as the foreign body. He now opened the blades, closed them on the gold band, exerted powerful traction for two or three minutes, and gradually drew it through the stricture. When finally removed, the band had been considerably flattened and elongated by being pulled through the narrow stricture. For grasping the foreign body, Ingals used a pair of forceps with serrated surfaces, the cutting edge of the teeth being directed towards the handle.

Keiper[2] records the case of a man, age 50, an alcoholic, who had suffered for some months from severe attacks of *asthma* with tenacious expectoration. After an injection of morphia, the bronchoscopic tube was passed and rhythmic contractions were noted, so marked as almost to close the bronchus. One gram of a 2 per cent solution of **Cocaine** with **Epinephrin** was injected by means of a long tracheal syringe. This procedure was followed by great relief and the expectoration of a large quantity of mucus. The treatment, however, had to be repeated.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 610; [2]*Ann. Otol.* 1914, Mar.

BURNS.

(*Vol.* 1913, *p.* 138)—Alexander's tests of various treatments lead him to favour **Picric Acid** for burns of the first degree, the **Boric Acid Bath** for burns of the second degree, and **Ichthyol Ointment** (gr. 48 added to olive oil dr. 2, with lanolin to make 3 oz.) for those of the third degree.

CAISSON DISEASE.

(*Vol.* 1914, *p.* 174)—For early cases the best treatment is **Recompression**, followed by slow decompression.

CANCER.

General principles of **X-ray** treatment discussed (*p.* 62). **Radium** (*pp.* 66, 67).

CAROTID TUMOURS. (*See* NECK, TUMOURS OF.)

CATARACT. *A. Hugh Thompson, M.D.*

Important contributions to our practical knowledge were made at the 1914 meeting of the Ophthalmological Society, when Treacher Collins opened a discussion on the *post-operative complications* of cataract extraction.[1] The first subject that he discussed was the relative merits of a corneal incision on the one hand and a limbal incision with a conjunctival flap on the other. There are two reasons why the latter is preferable. The first is as follows: "Should the lips of a corneal extraction incision fail to become agglutinated by the temporary coagulum, or, having become agglutinated, should they subsequently become reopened, there is a tendency for the surface epithelium to extend inwards more deeply than usual. It may even extend through the whole length of the incision and pass into the anterior chamber. In some cases the whole of the anterior chamber has become lined by epithelium proceeding down from the surface in this way. It will spread over the posterior surface of Descemet's membrane, over the anterior surface of the lens capsule and iris. In such cases increase of tension develops." This is therefore one of the possible causes of glaucoma following extraction. With an oblique limbal incision and a conjunctival flap, this complication is not liable to occur. The second and more important reason for the adoption of the latter method, is the greater protection that it affords against infection of the wound from without. A counter-consideration is that, according to Thomson Henderson,[2] a limbal incision is more liable to be followed by post-operative astigmatism than a corneal one.

The question of the causation of iritis and cyclitis after cataract extraction is one that must touch every operator very closely. In the first place it will be a consolation to many to be told on the authority of Treacher Collins that neither a few synechiæ nor a slight transient 'keratitis punctata' are by themselves sufficient evidence of infection.[3] He says, "Frequently after cataract extraction, one or two posterior synechiæ may form, when there are no other signs of inflammatory reaction, and when there is no reason to suspect the entrance into the eye of any micro-organisms. The formation of such posterior synechiæ is more frequent after removal of the lens than after a simple iridectomy. I would suggest that in such cases, when the iris comes in contact with a wound in the lens capsule, some of the damaged and degenerating cells of the capsule, by the chemiotactic substances which they generate, excite plastic exudate from the iris, resulting in the formation of a localized adhesion. If this be so, we can understand the importance of the early use of atropine after extraction, to keep the iris margin well drawn away from the wounded capsule.

We can also find an explanation why some operators have a preference for a peripheral incision of the lens capsule, which, if accompanied by an iridectomy, lies away from any possibility of contact with the iris. . . . I do not think that the presence of a few transient dots on the back of the cornea, any more than one or two isolated posterior synechiæ, necessarily implies the entrance into the eye of septic organisms. I would suggest the following possible explanation of their formation: At the time of the iridectomy some cells of the iris from the cut surface become detached and float off in the stream of the aqueous humour. These dying and degenerating cells become deposited on the posterior surface of the lower part of the cornea, and there generate a chemiotactic substance, which attracts around them polymorphonuclear leucocytes to effect their removal."

On the other hand, out of 518 cases of extraction at Moorfields between 1900 and 1912, Treacher Collins had 28 cases of severe iridocyclitis with keratitis punctata, eight of them with hypopyon. Some of them quieted down under treatment, but others did not, the eye having to be excised. There were five cases in which sympathetic ophthalmitis supervened. The questions as to how to obviate the occurrence of severe iridocyclitis, and how to deal with it when it does arise, are of paramount importance. As the result of pathological examination of excised eyes, Collins has frequently found pieces of lens capsule entangled in the scar, and at one time he was inclined to think that the piece acted as a foreign substance and excited inflammation in the wound around it. One of his sections, however, shows a piece of capsule quite harmlessly entangled in a cicatrix, so that it must be considered as proved that this by itself is not enough to do any harm. The danger lies in the delay in the union of the wound margins which the presence of the foreign substance causes. Again, soft lens matter lying in contact with the iris is not in itself sufficient to cause iritis, for this condition is what we purposely produce every time that we needle a juvenile cataract. The danger is that the soft lens matter mixed with aqueous affords a far more favourable medium for the growth of pathogenic organisms than pure aqueous. For a similar reason any interference with the vitreous during intra-ocular operations is especially to be deprecated, since it is a specially favourable medium for the growth of micro-organisms. Organisms such as *Staphylococcus albus* and *B. xerosis*, which are frequently present in the normal conjunctiva and are usually harmless, may become virulent under favourable conditions. To quote Treacher Collins again: "I would suggest, then, that post-operative septic endophthalmitis is due to infection with organisms which are saprophytes in the normal conjunctiva; that their entrance into the eye is facilitated by delayed closure of the extraction wound, due to an entangled lens capsule or a prolapsing vitreous; and that their growth in the anterior chamber is facilitated by the suspension of lens matter in the aqueous humour."

Leaving out of account, then, the possibility of endogenous infection after cataract extraction, on which opinions differ, the preventive treatment of septic iritis may be carried out on one or both of two lines. The first is the attempt to sterilize the conjunctiva. With this object, Herbert, Elliot, and other operators who have gained their experience in India, are in the habit of douching the conjunctival sac thoroughly with a 1–3000 solution of perchloride of mercury fifteen minutes prior to operation. The secretion of mucus which follows must be washed away with water or normal saline. So far as the prevention of gross infection goes, this measure appears to be effective, and these operators tell us that since they have adopted it, suppuration of the eyeball after extraction has been practically abolished in the large Indian clinics in which they work. The measure, however, is a severe one, and is always followed by considerable reaction. Treacher Collins suggests that its good results are due to the desquamation of the superficial epithelioid cells of the conjunctiva, which, as is well known, generally harbour a great number of micro-organisms.

Fig. 16.—Desmarre's modified bridge operation.

The other line of preventive treatment resolves itself into the avoidance of those conditions which have already been referred to, viz., entanglement of the capsule in the wound, prolapse of the vitreous, and the leaving of a large quantity of lens matter in the anterior chamber, in addition to the adoption of a technique which secures that the incision may have the protection of a conjunctival flap.

Maddox[4] goes further, and in order to provide a more reliable conjunctival protection, advocates the revival in certain cases of Desmarre's 'bridge' operation, in which the separation of the conjunctival flap is not completed (*Fig.* 16). As the presence of the bridge renders the subsequent stages of the operation more difficult, Maddox has modified Desmarre's original operation in the way indicated in the above figures. This operation is suitable for cases where the eyeball is more than usually prominent. On the other hand, when it is sunk in the orbit, it is hardly practicable.

Another operation devised with the same object is that of Van Lint, of Brussels,[5] known as the 'sliding flap' operation. It was demonstrated at the Oxford Ophthalmological Congress of 1912. As will be seen by the figures, the conjunctiva is dissected up from the whole upper half of the corneal margin and separated from the sclera for

about 1 cm., and two sutures are inserted as in *Fig.* 17. This is done as the first stage of the operation before the incision with the Graefe knife. After the extraction of the cataract the sutures are tied, and in this way the conjunctival flap is made to cover the region of the wound effectively, as is seen in *Fig.* 18. These operations should be borne in mind when we have to deal with a cataract in which danger is specially to be apprehended, as when an operation on the fellow eye has gone wrong. Van Lint recommends his procedure as a matter of routine. In practice, most surgeons make some sort of compromise between the attempt to sterilize the conjunctiva completely on the one hand, and to afford a complete protection of the wound on the other. In all cases it is essential that no actual conjunctivitis is present, and above all, that the lachrymal sac is in a healthy condition.

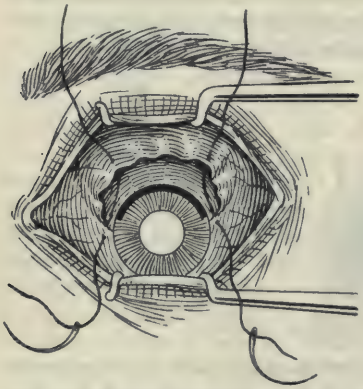

Fig. 17.—Van Lint's 'sliding flap' operation—the sutures.

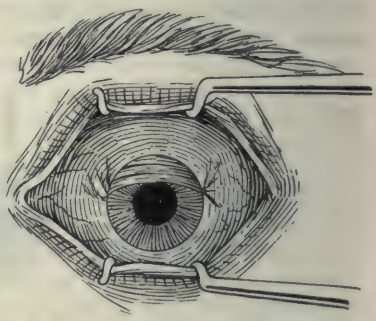

Fig. 18.—Van Lint's operation—conjunctival flap covering region of wound.
From "Ophthalmoscope."

With regard to the particular micro-organisms which are most to be dreaded, Browning,[6] who has had a large experience as bacteriologist to Moorfields Hospital, tells us that when once the eye has become infected and the organism is either the streptococcus or the pneumococcus, all efforts to save the eyes have failed. The staphylococcal infections are not quite so hopeless, and both he and Treacher Collins report favourable results from the use of antistaphylococcal **Vaccines.** In Browning's opinion, a bacteriological examination of the conjunctival sac ought always to be undertaken before operation. If pneumococcus, streptococcus, or *Staphylococcus aureus* is present, the operation must be deferred until they are got rid of by suitable treatment; but it is usually considered safe to operate in the presence of *Staphylococcus albus* or the xerosis ba illus. The practice of putting on a trial pad and bandage for twenty-four hours before operation should be condemned, as it increases the risk of subsequent infection.

Endogenous Infection.—The tendency among some authorities is to attribute all post-operative infections to exogenous infection, but may not some of them, and especially cases of late infection, be due to endogenous causes? This point was put in the discussion already referred to, by Ormond,[7] who instanced a case where a late infection was due to pyorrhœa alveolaris, clearing up when the teeth were extracted; and again by Richardson Cross,[8] who argued that it might be due to a septic focus in any distant part of the body. The writer has had occasion lately to recommend postponement of operation in two cases, each of which had a dirty, chronic ulcer of the leg. Such a condition is not uncommon in hospital patients, and should always be inquired for before deciding on a cataract operation.

Stationary Opacities of the Lens.—Can it be said with confidence of any lenticular opacities that they are not progressive and will never develop into what from the patient's point of view it is permissible to call 'cataract'? With regard to many congenital forms of lens opacity, the answer to this question is well known to be 'Yes'; but in addition to these cases it must be within the experience of every ophthalmic surgeon, to have watched slight peripheral opacities of the lens in middle-aged or old people which do not progress. Jessop[9] has watched fifty of these cases for periods of more than four years, some of whom had been told in earlier years by other medical men that they were suffering from 'cataract' and would have to undergo an operation. It is from among such cases that the successes of the cataract-curers, who treat their patients with douches, electricity, or suggestion, are drawn. The characteristics of these stationary opacities are thus described by Jessop: "The striæ are thin, fine, generally short straight lines; dull dark grey in colour by reflected, and black by transmitted, light. They are situated in the superficial layers of the cortex and apparently all in the same layer; they are found as a rule between the periphery and the equator of the lens, and are often hidden by the iris; in most cases they extend posteriorly, and then correspond in position to the anterior striæ. They often form a ring round the lens, and may be described as an 'arcus senilis lentis'; the arch found is pointed or 'Gothic,' in contradistinction to the 'Roman' form of arcus senilis corneæ. This condition is found in most people over seventy, and is evidently due to senile degeneration. In some cases the 'arcus senilis lentis' is the only change found, but in others there are isolated striæ, sometimes extending towards or across the centre of the pupil. These striæ do not tend to coalesce with others, and are all in the same layer of the lens."

REFERENCES.—[1]*Trans. Ophth. Soc.* xxxiv, 18; [2]*Ophth. Rev.* xxvi, 138; [3]*Trans. Ophth. Soc.* xxxiv, 18; [4]*Ophth. Rev.* 1914, Oct. 299; [5]*Ophthalmoscope*, 1912, 565; [6]*Trans. Ophth. Soc.* xxxiv, 58; [7]*Ibid.* 70; [8]*Ibid.* 94; [9]*Ibid.* 151.

CEREBRAL EMBOLISM AND THROMBOSIS. (*See* HEMIPLEGIA, ACUTE.)

CEREBRAL HÆMORRHAGE. (*See* HEMIPLEGIA, ACUTE.)

CEREBROSPINAL FEVER. *E. W. Goodall, M.D.*

Etiology.—An excellent statement of the case in favour of the infectivity of cerebrospinal fever is given by Dopter.[1] He shows conclusively, by a number of examples, that it can be transmitted by carriers. In some instances these appear to be healthy, though the meningococcus can be obtained from their nasopharynx; in others they are the subjects of nasopharyngeal catarrh, due to the specific organism.

Diagnosis.—During 1913 and the early part of 1914, there was a small outbreak in Bristol. In a paper dealing with it, J. Michell Clarke, J. Odery Symes, and P. J. Veale[2] emphasize the difficulties in diagnosis. According to them the disease it most closely resembled in the early stage was influenza, with its abrupt onset, accompanying fever, and severe pains in the head, back, and limbs. Less commonly there was drowsiness, with bowel disturbance, and typhoid fever was suspected. The diagnosis was especially difficult in infants; but curiously enough, "in the cases in this outbreak the symptoms and course were entirely unlike those of tuberculous meningitis, and there was therefore little risk of confusing the two." In some instances the symptoms of meningitis were not at all marked, or were even absent, so that the diagnosis was made by examination of the cerebrospinal fluid. In four cases a leptothrix bacillus was found in the cerebrospinal fluid in association with the meningococcus.

Treatment.—In the Bristol outbreak "the treatment consisted in **Frequent Lumbar Puncture,** and the intraspinal injection, after running off some of the cerebrospinal fluid, of **Antimeningococcal Serum** (Lister Institute). After the injection the pelvis was raised, so that the patient lay on an inclined plane, with the head lowermost. In one patient, desperately ill on admission, the serum was also injected intradurally through a small trephine opening in the temporal region of the skull, and this was also done in another case, in whom three full intraspinal doses had had little effect, and in whom the symptoms indicated that the brain was chiefly affected. Both these patients died. . . . The total quantities of serum given in six cases of recovery were 105, 75, 61, 60, 20, and 20 c.c. respectively. . . . A number of the cases had also **Hexamine** (*Urotropine*), 5 gr., every hour or two hours."

In three cases the pneumococcus (and not the meningococcus) was found in the cerebrospinal fluid. Two were treated with **Antipneumococcic Serum** intraspinally, and one of them recovered. The third case was dying when admitted.

S. P. Kramer[3] has described "a sudden paralysis of respiration without dyspnœa, coming on from five to twenty minutes after the lumbar injection of serum containing tricresol, exactly as sometimes happens when cocaine is injected into the subdural space." He holds that the paralysis is due to the tricresol, and is quite a different phenomenon from serum sickness and anaphylactic shock. He quotes Parmelee[4] as reporting 4·4 per cent of respiratory paralysis

amongst 224 serum-treated cases in Kansas City; while he himself reports 7·2 per cent amongst 96 cases treated in the Cincinnati Hospital.

References.—[1]*Presse Méd.* 1913, 1025; [2]*Brit. Med. Jour.* 1914, i, 1286; [3]*N. Y. Med. Jour.* 1914, i, 1139; [4]*Jour. Amer. Med. Assoc.* 1913, Mar. 1.

CEREBROSPINAL FLUID. (*See also* Syphilis, Cerebrospinal.)

O. C. Gruner, M.D.

The Gold Reaction.—Lee and Hinton[1] followed Lange's work of two years ago. They conclude that the gold test is of more value for the diagnosis of syphilis than is the Wassermann reaction performed with the same fluid. The reaction depends on the inhibition of precipitation of colloidal gold solution in the presence of sodium chloride. The need for absolute cleanliness in performing the test is strongly impressed, the water used for preparing dilutions being specially liable to bring about error. The technique of the test was described in the Medical Annual, 1914, *p.* 189, but may be repeated in view of the method of recording the findings which is brought out by Lee and Hinton, as well as by Miller and Levy,[2] Crinis and Franh,[3] Eiche,[4] and Kaplan and McClelland.[5]

Ten chemically clean test-tubes are set up, and receive 1 c.c. of 0·4 per cent salt solution (10 per cent salt solution diluted with sufficient double-distilled water). The first tube receives an extra 0·8 c.c. To the first tube is added 0·2 c.c. of the fluid to be tested, and the fluids are carefully mixed; 1 c.c. is withdrawn from tube 1, added to the second tube, mixed, and 1 c.c. withdrawn for tube 3, and so on. Now add 5 c.c. of the gold chloride solution to each tube, and watch the result. The test solution consists of 500 c.c. of freshly double-distilled water, heated to 60° C., 5 c.c. of 1 per cent gold chloride, immediately followed by 5 c.c. of 2 per cent potassium carbonate. The mixture is brought to a boil, and 5 c.c. of 1 per cent formalin are added quickly. Shake well. The solution should come out red with a tinge of yellow, and be absolutely clear. The results obtained in different cases are shown in the figures (*Figs.* 19, 20, 21).

The test has two advantages: very little material is required, and it is simple. The sharpness of the reaction and its delicacy are claimed to be much greater than holds with the Wassermann test. In the case of cerebrospinal fluid, Lee and Hinton claim that the reaction is nearly constant in cases of syphilis of the nervous system. Eiche concludes that the reaction is an extremely useful addition to the armamentarium of the clinical pathologist. Miller and Levy, in their laborious study of the subject, bring forward rather different conclusions. They prefer the Wassermann test in most syphilitic and parasyphilitic conditions. It is useful in the diagnosis of general paralysis, but is of most value in indicating the results of antisyphilitic treatment of diseases of the central nervous system. Kaplan and McClelland fail to corroborate the use of the test in all cases of syphilis of the central nervous system. The most characteristic curves are

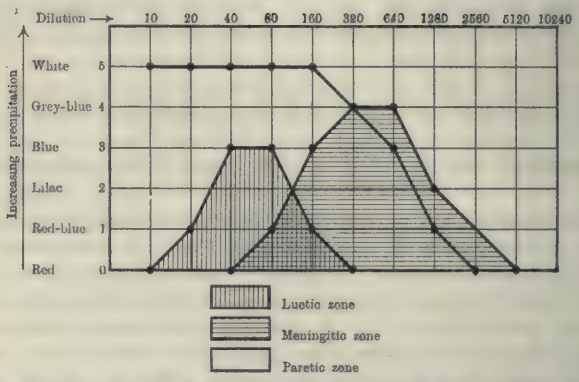

Fig. 19.—Diagram to show the different types of curve obtained by the colloidal-gold test. The luetic zone is made conspicuous by vertical shading, the meningitis by horizontal shading, while the paretic zone is left untouched. It will be noted that the last named is characterized by the occurrence of complete precipitation leaving a colourless fluid, and that the difference between the other two lies in the meningitic zone being displaced to the right. The meningitis referred to is either tuberculous or suppurative. The luetic cases, tabes and cases of cerebrospinal syphilis, fall within the first zone. The paretic zone is given by practically every case of general paralysis. The diagram is adapted from curves given in Miller and Levy's paper. The numbers at the head of the columns show the number of times of dilution. The zero abscissa represents no change in the gold solution.

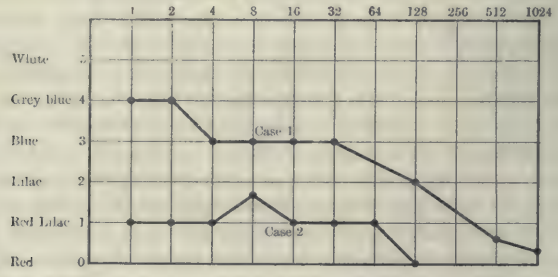

Fig. 20.—The diagram is constructed as *Fig.* 19, save that the figures at the head of the columns have only the first whole number. The curves are from two cases of disseminated sclerosis given by Crinis and Frank. There were no other evidences of disease in the fluids.

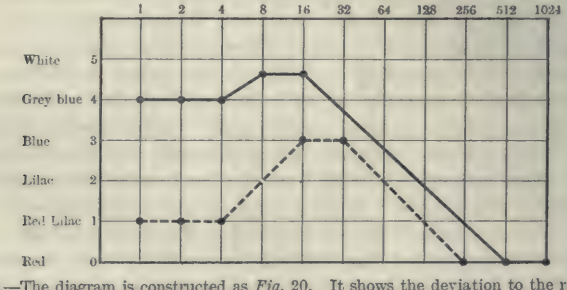

Fig. 21.—The diagram is constructed as *Fig.* 20. It shows the deviation to the right produced by treatment in a case of cerebrospinal syphilis. The two curves are given separately by Crinis and Frank.

given by general paralysis. The explanation of the discrepancy between these observers and those first quoted may lie in the fact that the criterion of syphilis is based on the parallel Wassermann reaction. There is much evidence in the literature that the latter is not always looked on as reliable when applied to cerebrospinal fluid. Crinis and Frank agree that the gold reaction is very sensitive for the diagnosis of general paralysis and tabes, and that it serves as a useful indication of the efficacy of treatment. They also claim positive results in disseminated sclerosis, chorea, and suppurative meningitis.

Surface Tension.—Kisch and Remertz[6] refer to the use of the stalagmometer for the study of cerebrospinal fluid. They find no basis justifying its clinical application.

Zonal Reaction.—To 1 c.c. cerebrospinal fluid is added 1 c.c. of 0·1 per cent potassium permanganate, as for a ring test. If there is no brown or yellow coloration at the junction fluid, there is no meningeal disease. It is very marked in myelitis (Boveri[7]).

Cytology.—Szécsi[8] discusses the cells in the cerebrospinal fluid from the aspect of modern hæmocytology. By using the oxydase reaction he concluded that the ' lymphocytes ' so frequently met with in this fluid are really myeloic cells and not blood-lymphocytes at all. They are histiogenic inflammatory tissue-lymphocytes in cases of general paralysis and tabes ; while in lues, acute meningitis, and other conditions, blood-lymphocytes are present.

Osmotic Tension.—Palmegiani,[9] using the cryoscopy method, ascertained that the fluid in tuberculous meningitis has a diminished osmotic tension. The tendency to hyposmosis diminishes with the advance of the disease. In other words, the freezing-point depression increases towards the end of life owing to the rapid formation of organic break-down products, which do not get excreted owing to the functional incapacity of the kidneys, whilst the asphyxial state of the blood also tends to lower the thermometer reading.

Bacillary Content.—Vincenzo Fragale[10] forestalled more recent observations in better-known journals, that tubercle bacilli are readily found in cerebrospinal fluid.

References.—[1]*Amer. Jour. Med. Sci.* 1914, i, 33 ; [2]*Johns Hop. Hosp. Bull.* 1914, 133 ; [3]*Münch. med. Woch.* 1914, 1216 ; [4]*Ibid.* 1913, 2713 ; [5]*Jour. Amer. Med. Assoc.* 1914, i, 511 ; [6]*Münch. med. Woch.* 1914, 1097 ; [7]*Ibid.* 1215 ; [8]*Deut. med. Woch.* 1913, 2558 ; [9]*Riv. di Clin. Ped.* 1913, pt. 11 ; [10]*Ibid.* 1912, pt. 10.

CERVICAL GLANDS, TUBERCULOSIS OF. (*See* Tuberculosis, Surgical.)

CHOLERA. *Sir Leonard Rogers, M.D., F.R.C.P.*

E. W. D. Greig,[1] working in Calcutta, has tested the viability of cholera vibrios in fresh cholera stools kept in flasks at room temperature and protected from light. Cultures were made daily, and in some instances quantitative determinations also. The organisms rapidly decrease in numbers, and entirely disappear in an average of five to

eight days in the cooler months of January to March, and in one to three days in the hot season from April to June. These observations support Greig's view that the cholera carrier is the main source of danger in spreading the disease.

C. V. Craster[2] records his experience of ship-borne cholera as seen at the New York quarantine station in 1911, when the disease was prevalent in the South of Europe, and especially in Italy, whence numerous immigrants go to New York. Whenever there was any suspicion of cholera having occurred on board a ship, all the steerage passengers were isolated on a quarantine island, and their stools repeatedly examined for cholera vibrios, which were identified after isolation by the serum-agglutination test. Between June 14 and August 18, sixteen cases of cholera occurred at sea, and fifteen more developed the disease while in quarantine and one among the quarantine employés. In addition, no less than thirty-one cholera carriers, without any clinical signs of the disease, were detected and retained until their stools had been repeatedly proved to be free from the organism. In examining large numbers of healthy persons for cholera vibrios, rectal swabs were taken, moistened with peptone water, passed well above the sphincter ani, and dropped into a peptone tube, which was dealt with in the usual way for isolating the cholera vibrio. In addition to those giving the specific serum reaction, over one hundred atypical forms did not agglutinate, but their significance is not yet determined. During the four months no less than 26,678 passengers were bacteriologically examined. Only 4 of the 31 carriers detected gave any history of diarrhœa. The organisms may be excreted intermittently, so it is necessary to obtain three or more negative results at intervals of two days before a cholera carrier can be released. One carrier remained infective up to fifty-four days. After an attack of cholera, the comma bacillus may be present for one or two weeks after symptoms have subsided, and exceptionally for longer periods.

C. Savas[3] deals with prophylactic inoculations against cholera in Greece during the Balkan War in 1913. He found that 99 per cent were protected by two inoculations, making it the most important method of protection. The mortality was also lowered from 20·6 to 10·2 per cent, the disease being of a mild type in this outbreak.

Treatment.—Otto Lowy[4] states that Gaertner and Bech found in 1893 that by 'oversalting' the blood by the injection of a strong salt solution, increased absorption of fluid from the intestines and body cavities resulted, and they recommended hypertonic intravenous injections in profuse diarrhœa. Rogers independently discovered the value of **Hypertonic Salines** and also of **Potassium Permanganate** in the treatment of cholera. Lowy has treated 28 cases of cholera, 8 of which were mild; 1 died untreated, and 1 who came later, died after the hypertonic treatment. Of the remaining 18, all were treated by subcutaneous injections of 1 to 1½ litres of hypertonic saline in the thigh, in combination with the **Serum** of Kraus in 4

of them. All were given permanganate of potash to drink, and also 10-min. doses of **Tinct. Iodi** three times a day, but never opium or morphia. Of the 18, 3 died. He confirms the value of hypertonic saline and potassium permanganate, and thinks the iodine influences the excretion of vibrios. J. J. A. Brachio,[5] in an outbreak of cholera in India, directed his assistants to treat the cases with iodine, and they reported favourable results. He has tried a single intraperitoneal injection of ¼ gr. of each of iodine and potassium iodide in 20 min. of water, **Adrenalin** being also freely given by the mouth. The cases, being treated in villages, could not be closely watched, but the vomiting was remarkably controlled ; 33 recovered and only 9 died.

Renault[6] reports on the injection of **Emetine Hydrochloride** in doses up to 0·6 gr. in the treatment of cholera without saline injections. Out of 60 cases, 44 recovered, or 73 per cent ; but it appears from his paper that for the most part 'desperate' cases were excluded in accordance with his orders, so the cases were not unselected. [The writer tried emetine injections independently of Renault, and before his paper was published, but found it to be inert, although apparently harmless.—L. R.]

References.—[1]*Ind. Jour. Med. Research* 1914, 481 ; [2]*Jour. Amer. Med. Assoc.* 1913, ii, 2210 ; [3]*Wien. klin. Woch.* 1914, 1093 ; [4]*Ibid.* 467 ; [5]*Ind. Med. Gaz.* 1914, 309 ; [6]*Ibid.* 270.

CHOREA.

(*Vol.* 1913, *p.* 425)—In severe cases Chloretone may have a remarkable effect in controlling the movements and inducing sleep.

CLAVICLE, TUBERCULOSIS OF. (*See* Tuberculosis, Surgical.)

COLD IN THE HEAD. (*See* Nose, Diseases of).

COLIC.—(*See* Abdominal Pain in Children.)

COLON, CANCER OF. *K. W. Monsarrat, F.R.C.S.*

Treatment.—Cruet[1] describes the method of colon resection employed by Quénu. It is applied in association with the principle of exteriorization. He defines the methods of exteriorization under two groups : those that are not associated with V resection of the mesentery (Reclus, Bloch, Hochenegg), and those that are (Paul, Mickulicz, Hartmann). The first group are open to obvious objections on the ground of insufficiency. Paul's operation is done in two stages, Mickulicz's in three, Hartmann's in two. Mickulicz's differs from Paul's in the complete closure of the peritoneal cavity before resection of the tumour. The second stage of Hartmann's is somewhat extensive, as it involves resection *en masse* of the parts concerned in the artificial anus.

Quénu's method is one of resection by exteriorization in three stages, although attempts have been made to eliminate one stage, with results at present uncertain. Its essential points are as follows :

The tumour is explored, its adhesions are separated, and the affected loop is delivered. An incision is then made through the peritoneum on the right side parallel with and about an inch from the junction of bowel and mesocolon (*Plate XVI, Fig. A*); a flap of peritoneum is then developed by peeling this membrane backwards off the mesocolon. This flap is sutured to the parietal peritoneum, which is similarly separated from the right edge of the wound in the abdominal wall (*Fig. B*). The same procedure is carried out on the left side of the loop. In this way both loop and mesocolon attached to it are excluded from the peritoneal cavity. Gauze packs are pushed down on each side (*Fig. C*); this completes the first stage. About a week later the loop, along with the mesocolon concerned, is resected, and the posterior halves of the circumference of the ends of the bowel are sutured together, leaving a small anus. The third stage consists in the closure of this small anus by enterorrhaphy. Cruet discusses the applicability of the method to various parts of the colon. Its chief advantage consists in the complete exclusion of the risk of peritoneum infection.

Körte[2] reported on the operative treatment of malignant disease of the large intestine to the International Medical Congress, 1913. He dealt with 254 cases of his own, and reviewed the reports in the literature since 1900. The mortality of the radical operation in these reported cases is 32·2 per cent. The 83 radical operations performed by Körte since 1900 were attended by 28·9 per cent mortality, but the figures of recent years show improvement. The two important risks of the operation are collapse and peritonitis. Acute occlusion of the bowel is a frequent complication, and about 38 per cent of cases first come for treatment with this condition. An emergency operation is then necessary, either cæcostomy or colostomy, and the radical operation which comes later has to be a several-stage operation. If the bowel be practically empty at the time of operation; if the extremities after resection are satisfactory in regard to blood-supply; and if they can be approximated without difficulty; then suture and reposition, the one-stage operation, is to be preferred. The prognosis of radical operation in the large bowel is comparatively favourable. Körte's figures show apparent cure (freedom from return for three to twenty-one years) in 27·7 per cent of all cases of radical operation, and in 39 per cent of those surviving the operation. If a palliative operation is all that can be done, an entero-anastomosis is to be preferred. When acute obstruction is present, this must be preceded by an emergency colostomy or cæcostomy.

Another similar clinical article is that by Rotter.[3] He reports 160 cases under treatment between 1893 and 1912. Of these, 79 had a radical operation performed. He agrees with general surgical opinion that the formation of an artificial anus is alone permissible in presence of acute obstruction. This operation itself was attended in his cases by a mortality of 44 per cent, entero-anastomosis by 60 per cent, and delivery and resection by 70 per cent. These figures all relate to

PLATE XVI.

CANCER OF COLON: QUÉNU'S METHOD OF RESECTION

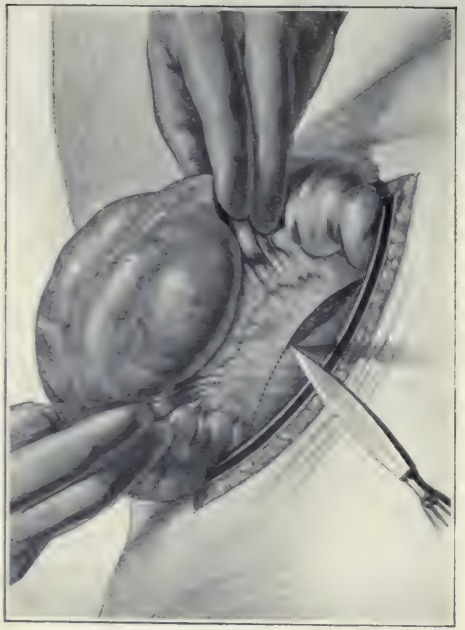

Fig A.

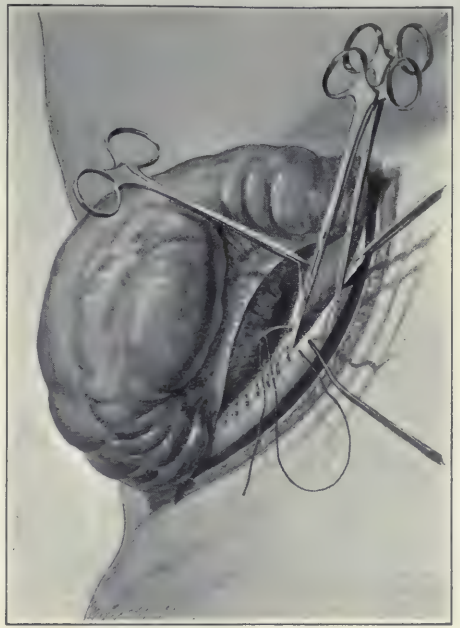

Fig. B.

Fig. C.

operation in the presence of obstruction. On the other hand, of the 79 cases on whom a radical operation was performed, only 15 (19 per cent) succumbed. In growths of the cæcum and ascending colon the end of the ileum and the colon to the hepatic flexure were removed, and the ileum anastomosed to the transverse colon, end to side. Rotter prefers continuous suture and invagination for the closure of the transverse colon. In cancer of the transverse colon and below, Mikulicz's 'advancement' method was employed in some, resection and end-to-end anastomosis in others. Of 27 cases operated on in two stages by Mikulicz's method, there was a mortality of 18 per cent; of 21 cases treated by resection and immediate suture, 28 per cent died. He considers immediate end-to-end anastomosis contra-indicated by the presence of much fat in the intestinal wall, or if the bowel is loaded with fæces or cannot be completely mobilized and sutured without tension. In 11 cases the transverse colon was united to the descending colon end to side or side to side, with a mortality of 10 per cent. Rotter evidently favours immediate suture after resection in selected cases.

Diagnosis.—Case,[4] for radiographic examination uses bismuth or barium sulphate meals, both by the mouth and by the rectum. It is essential that the bowel should be carefully emptied beforehand. When cancerous obstruction is present, the following observations are expected: (1) Delay in the passage of the opaque meal varying from forty-eight hours to several days. (2) Arrest of the bismuth given per anum: it must be shown that failure to fill the colon beyond a certain point is not due to want of pressure or to the accumulation of fæcal masses. (3) Dilatation of the bowel on the proximal side. This is evidence of serious obstruction. The shadow may end in a funnel-shaped process when the obstruction is by ring stricture, or by irregular lines due to the obstruction of a fungating mass in the lumen.

The absence of a palpable tumour at the side of the obstruction is not of importance in diagnosis. In administering an opaque enema the patient should be placed supine, an ordinary rectal tube is passed beyond the sphincter, the container is raised two feet, and the enema introduced. If no obstruction is present, the cæcum ought to fill in three to four minutes. The progress of the enema is watched with the screen, and if any obstruction appears to be present its site is noted and the examination is repeated and corrected later. The enema recommended is: barium sulphate 3 oz., alcohol 2 dr., gum tragacanth 140 gr., water 2 pints, given at a temperature of 100° F. Even in early carcinoma it will be found that the head of the column halts at the site of the tumour, and the distal colon distends under the pressure. After a few moments, a finger-like projection of the shadow may be observed, and the bismuth may then pass on and fill the colon beyond.

References.—[1]*Presse Méd.* 1914, July 15; [2]*Trans. Intern. Med. Congr.* London, 1913; [3]*Arch. f. klin. Chir.* cii, 651; [4]*Interstate Med. Jour.* xx, 1103.

CONJUNCTIVA, DISEASES OF.

John H. Yearsley, M.R.C.P., F.R.C.S.

Phlyctenular Conjunctivitis.—Theobald[1] finds that children who have this disease are usually well nourished and without signs of tuberculosis; but are improperly fed and badly housed, have furred tongues, torpid bowels, and foul stools. The facial eruption and nasal catarrh which are so often present support, in his opinion, the claim of eczema to the title it once enjoyed. Regarding the disease, therefore, as ophthalmia eczematosa, he regulates the child's diet, advises fresh air, and prescribes **Calomel, Easton's Syrup,** and (for local application) **Atropine** and **Yellow Oxide of Mercury Ointment;** and usually cures the patient in less than three weeks. The disease recurs in some children, but even in these, signs of tuberculosis are rarely found. Theobald is not convinced that tubercle has any connection with phlyctenular ophthalmia, and objects to the use of tuberculin because, if not harmful, it is at least superfluous in the treatment of an affection which readily yields to the remedies above mentioned.

Lawford[2] has noted the association of recurrent attacks of phlyctenular conjunctivitis with gastro-intestinal disturbance in children, and has found that the eye trouble is cut short by reducing the absorption of toxæmic products from the alimentary canal.

Tuberculosis of Conjunctiva.—Sattler,[3] as far back as 1891, arranged cases of conjunctival tuberculosis in four groups: (1) Ulcerative, (2) Nodular, (3) Proliferative, and (4) Lupus. There are cases which refuse to be labelled in this hard-and-fast way, but the classification can fairly claim to be clinically useful. Eyre has added a fifth class, the polypoid. Vederame[4] describes a case which he considers as belonging to a sixth group. A girl of fourteen had phlyctenules on both eyes. The usual treatment was given, the phlyctenules went, others came, but the patient was cured in seven weeks. The case resembles a frank phlyctenular conjunctivitis, but, as the intradermal skin reaction was positive, and the phlyctenules did not ulcerate, Vederame claims the case as tuberculous or, at least, tuberculo-toxic, although the bacillus of Koch was not found and there were no signs of tuberculous mischief elsewhere. In this connection the opinion of Eyre,[5] who has had a wide experience, should be remembered. He states that a positive skin reaction to tuberculin is of no value except in very early childhood, and that phlyctenular conjunctivitis, even if accompanied by tuberculous foci in other parts of the body, cannot be held to be tuberculous if Koch's bacillus is not found in the phylctenules.

A case of primary tuberculosis of the conjunctiva is reported by Danesi.[6] A girl of eight years, otherwise healthy, had an ulcer on the middle third of the inner surface of the left upper lid. The base and margin of the ulcer showed greyish-yellow points; the lid was red, swollen, and drooped, and the pre-auricular gland of the same side was enlarged. The ulcer was scraped and **Cauterized,** and **Iodoform**

PLATE XVII.

TUBERCULAR IODISM SIMULATING GUMMA OF THE EYELID

(Mr. Sydney Stephenson's Case.)

By kind permission of "The Ophthalmoscope."

Ointment daily applied. Three weeks later the cautery was again used. In six weeks from the commencement of treatment the ulcer was soundly healed. Microscopical examination of excised fragments, stained by Ziehl's method, discovered the bacillus of Koch. This case is an example of Sattler's first type of conjunctival tuberculosis mentioned above.

In Beauvieux's[7] experience, tuberculosis of the conjunctiva, especially of the proliferative type, is better treated by excision of the diseased area than by tuberculin. He cites the case of a girl twelve years old who had a '*végétation*' like an ulcerated chalazion on the inner surface of the right upper lid. The pre-auricular gland was enlarged. Excision was proposed but refused, and tuberculin was tried. A month's treatment, during which thirteen injections were given, had little or no result. The growth was then excised and a cure rapidly followed. There was no relapse.

Tubercular Iodism of Eyelid.—Sydney Stephenson's[8] case is an example of a rare type of lesion which may be caused by the administration of iodine compounds. In this case several papules appeared on the head and face. One, on the left lower lid (which was red and infiltrated), enlarged and became tender, and broke down into an ulcer which simulated a gumma (*see Plate XVII*). The patient had been treated for syphilis, and pigmented cicatrices were found on various parts of his body. On the appearance of the papules, potassium iodide (of which he had been taking 10 gr. thrice daily for several months) was stopped, **Sajodin** 1 gram twice a day given, and **Iodoform** applied to the ulcer. A month later there was still some redness and thickening of the lid, but the ulcer was healed, and the other lesions had greatly improved. The case supports the claim made for sajodin (which is an organic iodide) that it can replace other iodine compounds when these are not tolerated.

Trachoma.—Harston,[9] of Hong Kong, whose experience with **Solid Carbon-dioxide Snow** was referred to in the MEDICAL ANNUAL for 1913 (p. 181), now reports on more than 7000 cases of trachoma treated in this way. He applies the pencil firmly for fifteen to thirty seconds to the everted lids and transitional folds. The treatment is repeated in ten to fourteen days, when all reaction has subsided; the average duration of treatment is three months for a chronic and six months for a recent case. Harston claims that a cure is certain if the patient perseveres in the treatment, but ancillary methods such as **'Expression' of Granules** with Knapp's roller forceps and **Irradiation of Pannus** are not neglected.

Amyloid Degeneration of Conjunctiva.—This condition, which was first described by Oettingen, appears sometimes as a sequel to trachoma, though it has been found when no signs of trachoma were present. Adamük[10] reports three cases, all trachomatous. In the first case both lower lids were enlarged, thickened, hard, and elastic, and the interpalpebral fissure was narrowed. In the second case the right upper lid was alone affected, and the enlargement caused a partial

ectropion. In the third case the growth had taken place on the bulbar conjunctiva and cornea. The general health of all the patients was good, and the growths caused no more than mechanical inconvenience. The skin of the affected lids was normal. In all the cases the conjunctiva covering the growths was hypertrophied and of a pinkish-yellow colour. On section, after removal, they were seen to be composed of a yellowish, waxy, avascular substance. Adamük regards the material as a deposit between the connective-tissue cells and fibres, and not as a product of cell degeneration.

Hyaline Degeneration of Conjunctiva.—This is often a stage in the development of amyloid degeneration. The case recorded by Colombo[11] is rare, because the bulbar (not the palpebral) conjunctiva was affected, and there had been no trachoma. A small, hard, reddish, pedunculated growth was present just below each cornea; there was no pain or tenderness, but the patient complained of a feeling as if a foreign body were on each eye. The tumours were excised, and on section were found to be fibrous, friable, and of a uniform reddish colour. Stained with iodine or methyl-aniline violet, the sections did not give the amyloid reaction.

Primary Syphiloma of Eyelid.—In the MEDICAL ANNUAL for 1913 (p. 182) references were made to several cases of primary syphilomata of the eyelid and conjunctiva. A paper of Piccaluga's[12] gives two further cases. The first patient, a man, age fifty-one, who denied syphilis, had his right lower lid red and swollen, and its outer third was thickened and hard. There was itching, but no pain nor tenderness. On eversion of the lid, the inner surface was seen to be very red and œdematous, especially in its outer third, where was an ulcer with greyish floor and edges. The pre-auricular and submaxillary glands on the affected side were enlarged, and the Wassermann test was positive. The *Spirochæta pallida* was found in cultures of débris taken from the floor of the ulcer. Five intramuscular injections, each of 5 cgrams of **Calomel,** were given over a period of three weeks, at the end of which the lid was healed and the glandular enlargement had disappeared. No secondary symptoms developed. The other patient was a married woman of twenty-five years who had no history of syphilis. The outer two-thirds of the skin surface of the left upper lid showed a red swelling, on which was a shallow ulcer. The swelling was neither tender nor particularly hard, and the pre-auricular and submaxillary glands were scarcely palpable. As a typical roseolar eruption was present on the trunk and extremities, a bacteriological examination was scarcely necessary; it was made, however, and the spirochæte was found. Piccaluga considers that the absence of induration of the primary sore in this case was owing to the fact that the woman was not seen until the lesion had begun to resolve.

Angioma of Conjunctiva.—An example of this uncommon condition is described by Mayou.[13] The patient was a woman sixty-three years old who had noticed something growing on the right eye for four months (*see Plate XVIII*). The growth was removed, and

PLATE XVIII.

ANGIOMA OF CONJUNCTIVA

(Mr. Stephen Mayou's Case.)

By kind permission of the Ophthalmological Society

sections of it showed spaces lined by endothelium containing blood corpuscles.

Gonorrhœal Ophthalmia.—In a series of cases of gonoblennorrhœa adultorum (including a few children over one year old), Fehr[14] has had excellent results. The patients were kept in bed, and ice compresses applied if the cornea was sound; the conjunctival sac was washed out every hour day and night with **Permanganate of Potash** solution, the inner surface of the lids was brushed daily with **Silver Nitrate** (1 per cent solution), and **Atropine Ointment** placed in the lower sulcus. The chemosis, if great, was reduced by scarification, and corneal ulcers were cauterized and covered by a flap raised from the neighbouring conjunctiva. The patients numbered 45, and 53 eyes and two sockets were affected. Six corneæ had perished before admission. After treatment averaging five weeks, 71·7 per cent of the 53 eyes had good vision ($\frac{6}{12}$ to $\frac{6}{6}$); 11·3 per cent had useful vision; 17 per cent had little or no vision. When the disease was uniocular, the sound eye was successfully protected by a shield. As the 2 one-eyed patients had gonorrhœal urethritis, they probably contaminated their sockets while handling the artificial eyes. The gonococcus was found in 48 of the 53 eyes, and suspected in the remaining 5.

Hirschberg, in the same paper, contrasts Fehr's results with those recorded by Lawrence and others in the first half of the nineteenth century. We know now that blood-letting, purgatives, and emetics are of little value in a disease which demands energetic and constant local treatment if the cornea is to be saved.

Cecchetto[15] has found the effect of injections of the **Antigonococcic Vaccine** of Nicolle and Blaizot in gonorrhœal conjunctivitis little short of marvellous. The vaccine was used in three cases of infantile and one of adult ophthalmia. They were all cured in eight days, one infant having one, the others two, and the adult seven injections (one on each of successive days) under the skin of the abdomen. The only two corneal ulcers which appeared were rapidly cured, and, although the gonococcus was present in all the cases before treatment was begun, it could not be found a week later. The injections caused no disturbance, local or general. A douche of **Corrosive Sublimate Solution** (1–4000), **Picric Acid Ointment** (2 per cent), **Atropine Drops,** and a brush with **Silver Nitrate Solution** were used, but cannot be claimed as the chief causes of such remarkably rapid cures.

Subconjunctival Rupture of the Sclerotic.—The case reported by Addario,[16] of Catania, is interesting both because of its rarity and because it so closely simulated a subconjunctival luxation of the lens as to lead to an error in diagnosis. A woman, age 51, in stooping, knocked her right eye against the handle of a key in the lock of a trunk. Addario, who saw her a month later, found a large swelling above the cornea and in front of the insertions of the recti internus and superior. The eye was rather red, the anterior chamber very

shallow, the pupil widely dilated and with a large coloboma upwards and inwards. The media were clear, and no opacity was to be seen in the fundus. The eye was painful, the intra-ocular tension very high, and the vision reduced to finger-counting at eight inches. A diagnosis of subconjunctival luxation of the lens through a rupture of the sclerotic was made. At the operation no lens was found, but aqueous under pressure escaped from a cyst-like cavity, the wall of which was composed of conjunctiva, ciliary body, and iris. The lens was afterwards found (and left) at the back of the vitreous. Four months later the eye had not changed, except that the hernia had been reduced by the **Thermocautery, Pilocarpine** drops, and a **Compressive Bandage.**

Aniline Pencil Injury.—A clerk, age 18, while sharpening an aniline pencil, was struck on the eye by a bit of the 'lead.' Haas[17] saw him two hours afterwards. The conjunctiva was violet-coloured and injected, the superficial layers of the cornea were desquamated, and a fragment, which was found in the lower *cul de sac*, had caused a small ulcer of the inner surface of the lower lid. After the fragment was removed, and the eye washed out, **Collargol** drops were ordered and the eye was bandaged to favour corneal repair. Photophobia, marginal ulceration of the cornea, and redness of the conjunctiva remained for more than a month. The 'lead' was found to be of basic aniline. This is soluble and much more harmful than the acid aniline, which is insoluble.[18] Any fragment of basic aniline should be removed from the conjunctival sac as soon as possible, because the longer it is left in the greater is the damage to the eye.

Sophol recommended for gonococcal blennorrhœa (*p.* 33).

References.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 566; [2]*Proc. Roy. Soc. Med.* vi, No. 7, Supplement II, 127; [3]*Bericht über die* xxi *Versamm. der Ophth. Ges.* Heidelberg, 1891, 33; [4]*Annal. di Ottal.* 1914, 289; [5]*Lancet*, 1912, i, 1319; [6]*Annal. di Ottal.* 1913, 51; [7]*Arch. d'Ophtal.* 1914, 278; [8]*Ophthalmoscope*, 1914, 406; [9]*Ibid.* 654; [10]*Centr. f. prakt. Augenh.* 1914, 1 and 33; [11]*Annal. di Ottal.* 1913, 21; [12]*Ibid.* 885; [13]*Trans. Ophth. Soc.* xxxiii, 55; [14]*Centr. f. prakt. Augenh.* 1914, June 1; [15]*Annal. di Ottal.* 1914, 202; [16]*Ibid.* 191; [17]*Arch. d'Ophtal.* 1914, 300; [18]*Ophthalmoscope*, 1911, 61.

CONSTIPATION.

See **Istizin** for chronic constipation (*p.* 18), and **Sennatin** (*p.* 32).

(*See also* Alimentary Toxæmia and Chronic Intestinal Stasis.

COPRA ITCH.

E. Graham Little, M.D., F.R.C.P.

Castellani[1] demonstrated the presence of a minute acarus-like parasite as the cause of a dermatitis prevalent in workmen in copra mills in Ceylon. The hands, arms, legs, and sometimes the whole body except the face, are covered with extremely pruriginous papules and pustules. The eruption begins on the hands as a rule, and spreads to the arms, legs, and trunk. It never affects the face. The parasite is not a sarcoptes, but probably a hitherto undescribed variety of *Tyroglyphus longior*. It does not burrow into the skin. The eruption was produced experimentally by scattering the parasite on the

skin and applying a piece of lint over the part. It disappears spontaneously on removal of the conditions producing it, and this may be hastened by the application of 5 to 10 per cent β-**Naphthol Ointment.**

REFERENCE.—[1]*Brit. Jour. Derm.* 1913, 23.

CORNEAL ULCER. *A. Hugh Thompson, M.D.*

It has generally been supposed to be undesirable to leave sutures in contact with the corneal surface. Maddox,[1] however, finds that this can safely be done, provided that—(1) No knot comes near the cornea; (2) The threads do not cross one another; and (3) They are not too thin or tight. The chief utility of the measure consists in the increased facility with which conjunctival flaps can be fashioned for the protection of corneal ulcers or wounds (*see Fig.* 22).

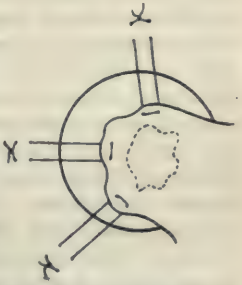

Fig. 22.—Supracorneal suture (Maddox).

Maddox also finds supracorneal sutures of use: (1) In the treatment of conical cornea by Morton's operation of excision of the apex of the cone, for the purpose of approximating the two edges of the wound;[2] and (2) As a measure of precaution during the extraction of cataract in a patient known to be an inveterate 'squeezer.'[3]

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 1148; [2]*Ibid.*; [3]*Ophth. Rev.* 1912, 9.

CORNS AND WARTS. (*See also* SKIN, GENERAL THERAPEUTICS.)
E. Graham Little, M.D., F.R.C.P.

Lewis Jones[1] regards corns as due to infective invasion, as is probably the case in warts, and ascribes the action of some of the methods which cure the corns to antiseptic and ionizing factors. **Salicylic Acid,** which is so largely used in the form of spirituous lotions, would probably act better if dissolved in borated water, for the addition of borax renders the acid more soluble in water. **Direct Ionization with Zinc Salts** is a very satisfactory means. The corn is first treated by soaking for some hours with zinc sulphate solution, 1 per cent; the centre of the corn is then treated with a zinc needle plunged into its substance and attached to the positive pole of the battery, and then the whole part is covered with a zinc pad, and so ionized. Warts are best treated by transfixion with a zinc needle attached to the positive pole, with a current of 1 ma. for a minute. When warts are numerous, small, and close together, a zinc pad covering them may be used instead of needling. **Magnesium Salts** may be preferred to zinc, especially for flat multiple warts of the back of the hand. Cauliflower warts of the scalp and face are easily removed with the zinc needle.

REFERENCE.—[1]*Brit. Med. Jour.* 1913, ii, 938.

CYCLICAL VOMITING. (*See* ACID INTOXICATION.)

CYSTITIS. (*See* BLADDER.)

DEMENTIA PRÆCOX. *Bedford Pierce, M.D., F.R.C.P.*

Douglas Singer[1] gives an interesting account of Kraepelin's modifications of his conception of dementia præcox.

Starting from a large group called the endogenous deteriorations which show the common peculiarity of arising "from internal causes without recognizable external occasion," and which, in the great majority of cases, result "in a greater or less degree of psychic infirmity," Kraepelin creates two main subdivisions: (1) Dementia præcox; (2) Paraphrenia. Dementia præcox is defined as "a series of condition-pictures the common characteristic of which is a peculiar disorganization of the inward coherence of the psychic personality, with predominating damage to the affective life and the will." Kraepelin admits that the name 'dementia præcox' is open to exception, as not all cases are precocious, and it is not certain that all fail to recover; but until more is known of the essential nature of the disorder it is not possible to select a better term. Instead of the well-known three forms, hebephrenic, catatonic, paranoid, eight varieties are now described, and some of these are again subdivided. It is explained that some of these are to be looked upon as distinct diseases. Complicated though this classification may be, it will readily be conceded that cases corresponding with all these varieties frequently occur. The doubt that arises is not that there are no such cases, but whether it is worth while to attempt so much subdivision when the various groups are so ill defined.

The following are the varieties as now described by Kraepelin :—

1. *Dementia simplex*, "an extremely insidious impoverishment and erosion of the entire mental life," which rarely needs care in a special institution. It is of very slow development, usually beginning in early life.

2. '*Silly*' *dementia*, especially marked by desultoriness in thought, feeling, and act, with progressive mental deterioration; was formerly included under hebephrenia. It forms 13 per cent of all asylum cases.

3. *Simple depressive or stuporous deterioration*, often with acute onset, and leading to a difficulty in diagnosis from depressed forms of manic-depressive insanity. It constitutes 10 per cent of asylum cases.

4. *Depressive deterioration with delusion*, in which delusions are more widely developed, and are more bizarre and incongruous.

5. *Excited varieties*. (*a*) Circular in type, usually depression followed by excitement; frequent remissions, often with apparently normal periods, but ending in dementia. (*b*) With agitation, often acute in onset; about 14 per cent of cases. Remissions for a few months, leading to an end stage of dementia. (*c*) Periodic type, often in women, associated with menstruation. Kraepelin points to the monotony, impulsiveness, and poverty of thought as aids in distinguishing these from manic-depressive insanity.

6. *Katatonia*, now restricted to a group of cases in which "the peculiar excitement with katatonic stupor controls the picture."

7. *Paranoid*, in which "delusions and sense falsification represent

the chief symptoms," leading to definite deterioration and excluding many cases formerly called paranoid.

8. *With speech confusion*, in which speech consists of utterly unintelligible words and phrases, without disorientation. Some capacity for useful occupation may be present.

Kraepelin admits that nothing is definitely known as to the cause of dementia præcox. He has doubts as to whether it is essentially a degeneracy, but inclines to the opinion that it arises from some auto-intoxication, possibly correlated with the sexual glands. He appears to reject the teachings of Jung as to its psycho-pathology, and evidently has no sympathy with Freud's psycho-analysis. Singer states that Kraepelin refuses to consider the subject from this point of view, and quotes the following: "Since I am accustomed to walk the firm ground of direct experiment, my philistine scientific conscience stumbles in its footsteps upon objections, reflections, and doubts over which the light-winged imaginations of the followers of Freud carry them without further ceremony." Kraepelin refuses to give figures as to the prognosis of dementia præcox, as he considers it impossible to say whether a remission will be permanent.

The second group, paraphrenia, is distinguished from dementia præcox by the absence of marked disorder of affection and the will, and consequently there is "less disturbance of the character of mental life." One variety of paraphrenia, p. systematica, appears to correspond with paranoia as usually described: another, p. phantastica, to a form of paranoid dementia. The desirability of separating these from dementia præcox is readily seen, but it appears quite unnecessary to introduce new names.

The general impression produced by the new classification is that the clinical picture, already somewhat obscure, has now become blurred, and that the addition of new details, instead of making for enlightenment, only leads to confusion. No doubt the term dementia præcox has come to stay, connoting as it does an assemblage of symptoms which justifies separate description. It seems a pity, however, that its author has not been content with painting the broad outlines of the picture, but has so overlaid it with detail that the general effect is damaged. Nevertheless, all will admit that the newly described varieties of this disorder do correspond with clinical experience.

Diagnosis.—In Germany much attention has been given to trials of Abderhalden's diagnostic methods, by which it is claimed that dementia præcox can be distinguished from manic-depressive insanity and from constitutional psychopathic states. Bresler[2] states that in at least thirty clinics researches are being carried out, and so promising is this method that in many cases special leave of absence has been given to medical officers to study the technique. He states that it is necessary to learn the method in some institution in which it is regularly practised, and that it is too complicated to admit of description within reasonable limits of space.

The general theory is that in some psychasthenic and manic-depressive persons there is no protective ferment in the blood-serum, and from this it is inferred there is no destruction of the cortex cerebri or other organs such as the sex glands or the thyroid. But in dementia præcox, owing to degenerative changes in the brain, and the testes and ovaries, specific ferments can be isolated by the Abderhalden dialysing method. In general paralysis there is no change in the thyroid and sex glands, but cortical changes are marked. Consequently, it is claimed that dementia præcox can be shown to be due to changes in the brain and sex-glands, associated in most cases with degeneration of the thyroid gland. It therefore becomes possible to distinguish this disease from manic-depressive insanity on the one hand and general paralysis and epilepsy on the other.

Although this new work gives support to the view long since suggested by Kraepelin, that changes in the sexual glands may be an important factor in the development of dementia præcox, this question is far from settled. Obregia[3] thinks, from the result of histological investigation, that changes in the sexual glands do not necessarily occur in this disease.

The diagnosis of dementia præcox is in many cases extremely difficult; and not a few cases presenting characteristic symptoms clear up completely and unexpectedly, whilst, on the other hand, patients who seem without doubt to be suffering from manic-depressive insanity fail to improve and rapidly become demented. Nervous signs are, moreover, not trustworthy or the most reliable. Pilcz's sign (contraction of the pupil on forcible closure of the eyelids) is reported by Briel to be present in only 78 per cent of cases (J. D. Rolleston[4]), so that from the physical examination the physician gets little assistance. Much has yet to be done before the position of dementia præcox as a specific disease with definite pathology can be considered to be established.

Treatment.—Bayard Holmes[5] discusses recent attempts by Ittom and by Lundvall to induce an artificial hyperleucocytosis by the injection of **Nucleinate of Sodium.** One patient is mentioned who after being mute for twelve years volunteered conversation and played chess. Lundvall recommends the injection subcutaneously of 2 to 15 c.c. of the following sterilized solution at intervals, corresponding to the duration of the reaction, of four to twenty days: Sodium nucleinate 10, sodium cinnamate 1, arsenious acid 0·005, distilled water 40. There may be pain at the seat of the injection, relieved by hot applications. Abscesses did not occur in several hundred applications. A few hours afterwards there is a chill, followed by rise in temperature. No patient was injured by the treatment. Of 18 cases of dementia præcox reported in full, 8 recovered, some rapidly, some slowly, but all completely; 5 improved remarkably, and in 3 only was there no improvement. Holmes concludes: "It is too much to believe that we have in Lundvall's remedy a method of curing dementia præcox, but his modest report certainly

commands us to investigate in our crowded institutions a method which has proved successful in 40 per cent of a most unpromising series of confirmed patients."

REFERENCES.—[1]*Jour. Nerv. and Ment. Dis.* 1914, June; [2]*Jour. Ment. Sci.* 1914, Apr.; [3]*L'Encéphale*, 1913, Feb.; [4]*Rev. Neurol. and Psych.* 1914, Feb.; [5]*Med. Rec.* 1914, i, 27.

DERMATITIS. *E. Graham Little, M.D., F.R.C.P.*

Semon[1] reports a case of facial dermatitis produced by hair dye, the ingredients used being a silver salt, pyrogallic acid, and sodium sulphate. A blotchy erythema of the face and scalp resulted, with severe itching and burning, œdema of the face, attacks of shivering, and feeling of serious illness, without temperature or pulse being affected. The treatment recommended in similar cases is to apply frequently a lotion of **Lead** or **Aluminium Acetate** 1 per cent on a mask of lint, and when the more acute symptoms have subsided, to replace these with **Zinc Cream,** with 2 per cent of **Ichthyol.** All stimulants are to be withheld meanwhile, and **Aspirin** (*acetyl-salicylic-acid*) is useful in treating the pain. Harding[2] contributes an interesting paper on the presumably arsenical causation of repeated and persistent attacks of furunculosis occurring in several members of a household, in five of whom arsenic was detected in the urine. It was supposed that the source was a powder which had been used to destroy insects in the rooms occupied by the family, and although none of the powder could be obtained, the dust of the rooms when analyzed showed a percentage of 1·4 of arsenious acid. A marked improvement resulted from a change of domicile after the arsenic had been discovered.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 904; [2]*Jour. Cutan. Dis.* 1914, 113.

DERMATITIS EXFOLIATIVA. *E. Graham Little, M.D., F.R.C.P.*

Ravogli[1] discusses conflicting views as to the propriety of regarding this disease as a separate entity, and reports two cases of a clinical character which would justify their description under this name. His personal view is that dermatitis exfoliativa is a disease *per se*, of the order of the erythemata, and that it is to be distinguished from pityriasis rubra of Hebra, and other erythrodermias. Histological investigation of the second case showed hyperæmia, congestion, exudation, and cellular infiltration. The cause is probably to be found in toxic products absorbed from the intestinal canal, and the treatment is to be directed to regulate the digestive functions, which are usually at fault. **Saline Aperients,** with **Salol,** were administered internally, and the body was covered with **Cod-liver Oil,** to which later, when scales were less in quantity, **Pine Tar** in the proportion of 1–3 was added. Indicanuria was present in both cases, and has been frequently recorded in others.

REFERENCE.—[1]*Jour. Cutan. Dis.* 1914, 224.

DIABETES MELLITUS.

Francis D. Boyd, M.D.
John D. Comrie, M.D.

A discussion at the British Medical Association meeting upon non-diabetic glycosuria served to show the smallness of the knowledge which still exists as to the specific nature of diabetes and the increased importance with which temporary or intermittent glycosuria is now regarded. Garrod[1] referred to cases in which there is a permanent small excretion of sugar without any increase, sometimes even with a diminution of the sugar in the blood. In one such case—a child he had had under observation for two years—diet had no effect in augmenting the amount of sugar, nor even the administration of glucose up to 25 grams. In another case with polyuria, following an attack of 'Java fever,' he had found that there was recurrent excretion of sugar at intervals, though between these times of glycosuria the administration of even 100 grams of glucose caused no increase of the sugar in the urine. In still another case, a man past middle life excreted sugar in the urine steadily for six months and was regarded as a case of mild diabetes ; thereafter, he was observed for ten years without ever showing glycosuria, although he developed chronic nephritis. Again, very frequently glycosuria is met as a temporary event in the course of acute diseases, such as pneumonia, scarlatina, secondary syphilis, mumps, and phlegmonous inflammations.

Life Assurance.—In regard to such cases as the above, Turner[2] mentioned 8 persons under thirty years of age, in whom sugar had been found on medical examination but had disappeared subsequently ; all of these having been accepted, were alive and well at periods ranging from eight to twenty-four years afterwards. On the other hand, of 5 persons in whom sugar was first detected after the age of fifty, 2 died within four years, 1 lived for eighteen years, and 2 were still alive five and six years respectively after the first discovery of sugar. He concludes, accordingly, that uncomplicated cases of transitory glycosuria in young persons with a good family history may be accepted safely with an addition of five or six years to the premium, but that cases showing personal or family disability should not be accepted at all, or only at a heavy addition. May[3] gives an opinion as to the significance of diabetic family history in life assurance. He found that of the total deaths in one Company's assured lives, about $1\frac{1}{2}$ per cent were due to diabetes. When the family histories of all those dying from diabetes were examined, a death from diabetes among near relatives was found in 3·6 per cent, while the number of such deaths to be found among the general run of proponents is 1·05 per cent. His investigation showed that the family history on this point is important, as the 'family type' of diabetes tends to occur earlier and prove more quickly fatal than the 'acquired type' of later life, and occurs especially among men.

The conditions of various *internal secreting organs* which may be accompanied by glycosuria are reviewed by Hale White.[4] In the first place, there is a group of cases generally known as 'renal

diabetes,' in which a person passes constantly a small but detectable amount of sugar, which is not abolished by diminishing the carbohydrate intake ; there is no increase of the sugar in the blood. It is supposed that such cases, which are of little pathological significance, are due to an abnormal permeability of the kidney to sugar, caused perhaps by some toxin, in a manner analogous to the glycosuria set up in animals to which phloridzin has been given. In exophthalmic goitre, temporary glycosuria is quite common, and this writer has had three cases of Graves's disease in which death resulted from diabetes ; it is a strange fact that the diabetes may advance even while the exophthalmic goitre is apparently retrogressive. There is no evidence so far how the disease of the thyroid gland lowers the tolerance of the body for sugar. Similarly, in disease of the pituitary body, when this structure is increased in size and over-secreting, there may be glycosuria ; but on the other hand, when there is hypopituitarism, one of the results is increased sugar tolerance, just as in myxœdema. It has been suggested that some cases of mild glycosuria in old people may be due to increased adrenal activity, for the chromaffin tissues are supposed to become more active as age advances ; but of this there is no direct clinical evidence. Disease of the pancreas is still regarded as by far the most common cause of diabetes, and this writer found that a quarter of all the patients dying in Guy's Hospital from diabetes had a small or atrophic pancreas ; nevertheless, in many cases it is quite impossible to trace any such process, even on histological examination. The rôle played by the liver in producing diabetes is at the present day regarded as a very small one ; many of the cases of glycosuria associated with hepatic enlargement, etc., are due to over-eating, while others associated with gall-stones are perhaps due to concomitant pancreatic derangement. With regard to the nervous system, it is true that shock, concussion, and similar conditions may produce mild transitory glycosuria ; but as a cause of severe diabetes, the nervous system is not now held to play an important part.

Labbé and Bouchage[5] impress the importance of recognizing those cases which are of hepatic origin, because they are as a rule benign, and may be cured if the anatomical and functional integrity of the liver can be restored. They hold that this form of diabetes is brought on mainly by excessive meat-eating, so that the proper treatment consists in administration of **Mineral Waters,** such as those of Vichy, Brides, or Carlsbad, **Hepatic Opotherapy,** a **Lactovegetarian Diet,** and especially a reduction of the meat ingested. Similarly, Bouchut and Volmat[6] analyze cases of hepatic diabetes, which they found associated with hypertrophic cirrhosis and obesity, and amenable to treatment.

There is a peculiar type of diabetes known as *bronzed*, which forms a clinical entity characterized by a peculiar pigmentation of the skin and persistent glycosuria. A case of this type was carefully investigated by Gaskell, Sladden, Wallis, Vaile, and Garrod,[7] who found that,

as in previously described cases, there were fibrosis and deep-brown pigmentation of the liver and pancreas, with intense pigmentation of other internal organs as well as of the skin. The pigmentation appeared to be due to defective iron metabolism, leading to its retention in the cells of the body instead of being gradually excreted ; the diabetes is doubtless a consequent of the pancreatic condition.

Halpern[8] investigated the *condition of the blood* in a large number of diabetes cases. Although the red and white corpuscles are unchanged as to numbers, the lymphocytes on a relative count were present in greatly increased proportion, frequently amounting to 40 per cent ; also the hæmoglobin was often much diminished, which is an indication for treatment by **Iron**. Blood-transfusion in diabetes mellitus has been tried by Raulston and Woodyatt,[9] with, however, unsatisfactory results, as a rise in glucose-excretion at once followed, together with an increase of acetone bodies and of the glucose-to-nitrogen ratio. These writers conclude, therefore, that in severe diabetes mellitus, blood-transfusion is definitely contra-indicated.

With regard to the important question of determining whether there is increase of sugar in the blood, Bang[10] proposes a clinical method available for the practitioner at the bedside. One cuts out of good filter-paper some pieces the size of postage stamps, and allows two or three drops of the blood that is to be tested to fall on the centre of one. The paper is placed in a test-tube ; in another test-tube 5 c.c. of a strong solution of potassium chloride slightly acidulated with HCl is boiled, and this is then poured into the first tube ; the salt solution is allowed to digest the blood and cool down for half an hour ; one then adds five drops of Fehling's solution No. 2, and two drops of No. 1, boils for half a minute, and watches for the reduction change. If reduction is apparent, it means that the blood contains more than the normal amount of sugar (i.e., about ·15 per cent).

The condition known as *renal diabetes* (i.e., a state in which glycosuria is present, not because of disturbed metabolism, but because the kidney epithelium is too permeable for the sugar circulating in the blood) has attracted a good deal of attention lately. Galambos[11] points out that it may be diagnosed by an examination of the blood-sugar, which is found not to be increased or indeed to be diminished, and by the fact that carbohydrate diet does not increase the glycosuria. Nevertheless, acidosis and the danger of coma also threaten the renal diabetic, and hence the absolute necessity for him of a diet rich in carbohydrates. Salomon[12] records 13 cases of this nature, with blood-sugar not increased and glycosuria independent of the amount of carbohydrate ingested, and indicates the important fact that this type of the disease, like the common or pancreatic type, may run in families. In one family, four members were thus affected, of whom he describes three in detail ; in another family, two persons, of whom he records one in full, had this type of glycosuria.

Treatment.—Ringolsky[13] gives an appreciation of **Menyhert's Ferment** therapy, which he had tried extensively, and which he thinks

should be used if simple dietetic methods fail. Briefly stated, this consists in the administration of a proteolytic ferment, **Papain** (·3 gram in keratin-coated pills); also a lypolytic ferment, **Steapsin,** in similar form, which is given when much fat is taken in the diet, together with large and frequently repeated doses of **Bicarbonate of Soda.** The writer records several highly successful cases.

Lambert and Foster[14] draw attention to the good results following *dietetic measures* in cases of diabetic gangrene. As they show, this gangrene is usually simply a localized necrosis due to organismal invasion which does not spread widely, though sometimes it is due to changes in the blood-vessels. Without any surgical intervention, it will usually yield to a strict dietetic regimen, which should be of a protein nature if there is no threatening of acidosis; while the oat-meal diet gives the best results if there be any danger from this source.

Eising[15] draws attention to several cases which have come under his notice, where glycosuria complicated ovarian tumours or enlarged prostate; in the case of both these diseases the diabetes disappeared when the morbid condition was relieved by operation. Grafe[16] describes the results of the **Caramel** treatment for diabetes. The caramel is prepared by heating sugar above its melting-point for some time. Either cane or grape sugar may be used, and in the case of the former, the sugar is placed in a flat aluminium dish and heated to a temperature of about 200° C. in an oven for half to three-quarters of an hour. The resulting spongy mass dissolves readily in water, contains only 3 to 5 per cent of sugar, and has a bitter taste. It is said to have the advantage of being without effect in increasing glycosuria, although it operates to prevent acidosis. It may be given to the extent of 100 to 150 grams daily.

References.—[1]*Brit. Med. Jour.* 1913, 850; [2]*Loc. cit.* 855; [3]*Lancet,* 1914, i, 679; [4]*Ibid.* 1914, i, 367; [5]*Ibid.* 1914, i, 13; [6]*Rev. de Méd.* 1913, Oct. 753; [7]*Quart. Jour. Med.* 1914, 129; [8]*Berl. klin. Woch.* 1914, i, 396; [9]*Jour. Amer. Med. Assoc.* 1914, 996; [10]*Münch. med. Woch.* 1913, 2277; [11]*Deut. med. Woch.* 1914, 1301; [12]*Ibid.* 1914, 217; [13]*Ther. Gaz.* 1914, 160; [14]*Ann. Surg.* 1914, 176; [15]*Jour. Amer. Med. Assoc.* 1914, 1244; [16]*Münch. med. Woch.* 1914, 1433.

DIARRHŒA, INFANTILE. *Frederick Langmead, M.D., F.R.C.P.*

Etiology.—The relative importance of heat, improper feeding, and infection in the etiology of summer diarrhœa is commanding considerable attention. Whilst German writers lay by far the greatest stress on the first of these causes, English and American observers, on the other hand, more often ascribe the chief rôle to infection. Writing on the effect of *heat,* J. W. Schereschewsky[1] refers to Liefmann and Lindmann, who distinguished between an early and late summer infant mortality. In the early summer there is a close parallelism between the temperature and the mortality, but in the late summer the infant death-rate does not diminish in proportion to the falling temperature. The indoor temperature and the amount of circulation of air influence the death-rate, for in houses where there is free access

of air, and in high-lying districts, the mortality is less. It is less among infants living in cool rooms such as cellars. Against the infective theory he raises certain arguments. In true milk epidemics, he says, adults as well as children are affected. In Halle, infants fed on sterilized milk succumbed rather more frequently than those brought up on ordinary milk. The same is true of condensed milks. Again, several of the infants die within twenty-four hours, and it is difficult to conceive that this can be the effect of bacterial action. The mortality among breast-fed infants was twice as high in August as in June. He discredits the view that infection is spread by flies, pointing out that, whilst only 32 per cent of the breast-fed suffered from diarrhœa, 90 per cent of the bottle-fed were affected, both sets of infants deriving an equal amount of food from the table. In his experience the severest forms of diarrhœa only occur after exposure to a very high indoor temperature. In such cases the body temperature is always raised, and hydrotherapy produces good results.

Opposed to these conclusions is the work of D. B. Armstrong.[2] Two similar areas were selected in the overcrowded and insanitary Italian quarter of New York. In one an educational campaign against the house-fly was conducted, 1700 doors and windows were carefully scoured, and fly-traps were freely used. In the other no special effort was made. In the latter, diarrhœal diseases occurred three times as often among children under five years of age as in the former, and the average duration of the illness was longer.

Kendall, Day, and Bagg,[3] of the Boston Floating Hospital, have investigated the diarrhœa epidemics of the summers of 1910, 1911, and 1912 from the *bacteriological* standpoint. The bacteria found in the stools differed widely in the several years. In 1910, 75 per cent of the cases were due to dysentery bacilli ; gas bacilli were found in 6 out of 52 cases ; streptococci were commonly found both in the dysenteric cases and alone. In 1911, the organism most commonly found was a streptococcus, and sequelæ due to streptococcal infection were frequent. In 1912, gas bacilli were obtained in 53 out of 135 cases examined, in unusually large numbers. It is interesting to note that in spite of the variety of organisms of very different characters, the clinical features were quite constant.

R. H. Smith[4] points out that the treatment of infantile diarrhœa due to the dysentery bacillus should be different from the treatment of that which is caused by infection by the gas bacillus. In the former, a minimum of toxic products is formed in the presence of an excess of carbohydrates ; whilst, in the latter, carbohydrates favour the multiplication of the organisms.

Kendall, Day, and Bagg state that the number of cases of infantile diarrhœa occurring in the extremely hot summer of 1911 was not greater than that of the previous year, and that the cases were not more severe. Consequently, it is not justifiable to regard extreme heat as a cause of the condition. They found it impossible, in most cases, to distinguish between the effects of improper feeding *per se*

and those of improper feeding as a predisposing cause of bacterial infection. On the other hand, the organisms which they found in the stools of children suffering from the complaint were not infrequently seen also in those of perfectly healthy infants.

W. F. Litchfield,[5] writing of the disease as it occurs in Australia, is altogether of opinion that it is infective in origin, due to an organism or organisms at present undetermined. Therefore its ravages are to be checked by the encouragement of breast-feeding, the prevention of domestic overcrowding, and the inculcation of public and domestic cleanliness. The worst form of overcrowding is where a number of artificially-fed infants are housed together. People should be taught that diarrhœa is an infectious disease, and that the discharges and soiled napkins should be disinfected and disposed of as carefully as is done in cases of typhoid fever. Further, infants with diarrhœa should not be taken to other homes where there are children. He agrees with Newsholme, Peters, and others, that infection of the milk takes place in the home as a rule, and that only rarely can the source of the milk supply be blamed. Although milk is an important vehicle of infection, there are many other sources, as by direct personal contact, and through soiled clothes, polluted floors, and even infected dust. Sterilization of the milk alone has not done much to lessen the incidence of diarrhœa. The fact that badly nourished infants succumb more readily, indicates that every care should be taken to keep the child in a good state of health, by good feeding, good surroundings, and careful mothering.

Symptoms.—Litchfield recognizes two main stages in the disease —those of inflammation and of exhaustion. The two overlap to some extent, but the essential feature of the latter is a depression of the whole vital forces, resulting in a stagnant circulation, utter weariness, and marked muscular weakness. The depression of the organs of digestion and assimilation is of the most serious import, because while it lasts, wasting continues and the child is threatened by starvation. If food be taken, it may not be metabolised, and the system may become charged with deleterious products. Moreover, this stimulation of exhausted tissues prevents their recuperation, and is probably in part the explanation of the nutritional failure and atrophy that often occur.

C. A. Thelander[6] recorded his experience of about 400 cases of the disorder in Brisbane. In 80 per cent of the cases the first thing observed was that the child refused its food. In almost 20 per cent there were pulmonary complications, varying in severity from a few râles to serious bronchopneumonia. Quite frequently it was for respiratory symptoms that advice was sought. Three cases only had epileptic fits. None developed cardiac complications. General œdema was noted twice in patients who were taking albumin water. The gastro-intestinal symptoms were the most important ; loss of appetite was always present, and vomiting occurred in about 20 per cent. The amount of abdominal pain varied greatly. After an initial constipa-

tion, the stools were not usually green, but whitish or very pale yellow in colour. He lays stress on the recognition of these stools, which precede the better-known green evacuations containing mucus, traces of blood, and pus. In many cases he observed a curious pink stain surrounding the dark green of the stool, a circumstance which he regards as an indication that the disease is likely to recur.

TREATMENT.—Litchfield recounts the treatment he has found most valuable in the Australian cases; it is on much the same lines as that mostly used in the British Isles. At the onset an **Anæsthetic** may be required to arrest convulsions, **Tepid Sponging** or **Cold Packs** to reduce the fever, or a cautious dose of **Morphia** to relieve the pain or restlessness. Collapse is the first special symptom to be watched for and combated. It manifests itself by pallor, restlessness, sunken eyes, cold extremities, and a weak rapid pulse; the temperature in the rectum may be high. The immediate remedies to be applied are **Mustard Baths** or **Packs,** and **Alcohol.** If a satisfactory reaction does not occur, subcutaneous or intravenous isotonic **Salt Solution** may be given. Although he has found subcutaneous salt solution valuable, he has not been able to support the extravagant claims which some have made for it. **Sea Water,** too, failed to come up to its reputation. Possibly, he thinks, the instances of failure with salines are due to a want of distinguishing between shock and collapse, in the former of which it is not so clearly indicated. He lays more stress on the value of alcohol than do most practitioners, and advises that it should be given, freely diluted, throughout the acute stage of the disease. A brisk purgative, such as **Castor Oil,** should be given early. The old plan of continuous and gentle purgation he regards as the best procedure when the attack has developed, and for this purpose prefers a mercurial preparation such as **Grey Powder** gr. $\frac{1}{8}$ to $\frac{1}{4}$ every four hours, **Calomel** gr. $\frac{1}{12}$ to $\frac{1}{8}$, **Hydrarg. Perchlor.** gr. $\frac{1}{80}$ every hour or gr. $\frac{1}{40}$ every two hours; alternatives are 10 to 20 drops of **Castor Oil** or 10 grains of **Epsom Salts** every four hours. **Opium** should not be given as a routine, but where there is much pain, restlessness, and straining, small doses of Dover's powder (gr. $\frac{1}{12}$ to $\frac{1}{8}$) or tincture of opium (min. $\frac{1}{8}$ to $\frac{1}{2}$) every fourth hour may be given as a temporary measure. The value of **Bismuth** he has found difficult to estimate, and has obtained no better results with large doses than with small. He doubts the value of intestinal antiseptics, and has no faith in astringents. He recommends the application of **Hot Cloths** to the abdomen for colic, and **Hot Baths** or **Packs** to induce sleep if there is much restlessness. **Washing out the Bowel** with warm saline solution relieves some of the distress when the motions are very frequent, and if they are dysenteric in character, small **Starch Enemata** may be used.

With regard to *diet,* he follows the common procedure of giving nothing but water by the mouth for some hours after the onset. Subsequently **Whey** may be given, a food which he considers to be particularly indicated, supplying as it does not only nourishment, but

salts to replace those drained off in the evacuations. White wine whey he regards as an excellent preparation in the acute stages. Children who are being breast fed should not be weaned. **Albumin Water,** to which **Barley Water, Sugar, Brandy, Lime Water,** and **Cinnamon Water** may be added, is also suitable when the condition is active. After the first few days the child passes into the stage of exhaustion, showing great distaste for food, and suffering from a distressing wakefulness. The disorder has become a nutritional one, and rest and individual nursing are so clearly indicated that he maintains that these cases should not be treated in hospitals. Sleep is best obtained by keeping the child in the open air and in a cool place. In no case should food be forced upon the infant. Often the condition becomes chronic, leading to atrophy and marasmus due to want of assimilation. Fats should be omitted from the dietary. If carbohydrates cause disturbance they should be replaced by **Raw Meat Juice** or a **Casein** mixture. Sometimes a mixture of carbohydrates agrees better than a single one, and **Keller's Malt Soup** is useful in some cases. Food should not be given more frequently than every four or six hours. **Fruit Juice** may do good and is usually relished. **Buttermilk** may be tried. Some of the older children evince a desire for dry food, and for them a little **Stale Bread, Toast,** or **Biscuit** may prove useful. **Cheadle's Bread Jelly** suits some cases, whilst **Condensed Milk** or proprietary foods are sometimes given with advantage. As Litchfield says, there is no royal road to success in these cases. They require unremitting attention, general measures such as those advocated above and feeding on the lines indicated, with common-sense modifications.

Thelander never employs gastric or rectal lavage. When the child has been taken off milk in the early stages, he recommends that water should be given copiously, after which he employs **Liquid Peptonoids** or other albuminous foods. The first medicine he generally advises is **Calomel** 1 to 2 gr. every hour or two, for from four to six doses, and sees no reason for giving the small doses which are often administered. On the following morning he gives **Magnesium Sulphate** in doses of from 20 to 30 gr., adding a little **Salol** or **Menthol** and **Glycerin.** Magnesium sulphate is continued four or five times a day for several days till the stools are yellow. During that time no milk or milk products are allowed. Afterwards, in his experience, there is rarely any difficulty in the feeding. He prefers modified cow's milk. Children over two years of age may very soon be given **Baked Apple, Marrow,** and **Pumpkin,** and lightly cooked or raw **Egg** is often well borne. He never uses bismuth, opium, or astringents.

[These views of two Australian writers, in some points exactly opposite, are an index of the differences which still exist concerning the treatment of this important disease, and are a sure sign of the absence of any specific remedy.—F. L.]

Chronic Diarrhœa in Children.—There is a chronic condition occurring in children, with recurrent diarrhœa as one of the symptoms, the etiology of which is obscure, the results serious and far-reaching, and the

treatment difficult and often very discouraging. It is by no means rare. Described by ancient writers, its elucidation has been approached in comparatively recent years by many investigators from different standpoints. Gee, under the title 'morbus coeliacus,' described its chief clinical features. Cheadle, impressed by the colour of the stools and the excess of fat which they contain, named it 'acholia,' a term which we now know to be too committal, for bile is not absent. Herter, recognising the degree of infantilism which frequently follows, entitled it 'intestinal infantilism,' and laid stress on the preponderance of Gram-positive intestinal flora, to which he attributed the condition. Gibbons emphasized the importance of the derangement of the intestinal glands. Cautley included it among the forms of intestinal dyspepsia. Poynton, Armstrong, and Nabarro[7] have described in detail six cases. One of these is of particular interest, because of the completeness of the post-mortem examination. The condition of the large bowel closely resembled that of dysentery. There was no striking change in the Peyer's patches. The pancreas showed only early interlobular fibrosis. The liver was in an advanced stage of fatty degeneration. A variant of *Bacillus dysenteriæ* was isolated from the bowel. It is interesting to find that similar organisms were obtained in two other cases. The authors suggest the possibility that the lesions of the intestine may be the result of some particular infection, e.g., by the bacillus of dysentery, and that the symptoms which make up the clinical picture may be accounted for by the state of the liver. It seems possible that there may be some particular poison, which disturbs the functions of the liver without causing jaundice. Malabsorption they regard as a predominant feature in this affection, and one which sufficiently explains the infantilism, the weakness of the lower extremities, the flatulent distention, and the general flabbiness and anæmia.

As these authors point out, the *diagnosis* of this condition from abdominal tuberculosis is often difficult. Generally speaking, extreme illness is more rapidly reached and more readily recovered from. The absence of tuberculous masses in the abdomen is another important guide. On the other hand, the occurrence in a few cases of general anasarca, with ascites, is remarkable. The tendency to great abdominal distention may lead to its confusion with Hirschsprung's disease, and possibly some cases described under that title are the result of this form of diarrhœa, the gut having been left in an atonic dilated state, and constipation ensuing.

Poynton, Armstrong, and Nabarro speak of the differences in the way in which individual cases react to **Diet.** Fat appears to be dealt with worst, yet some patients may take cream. Carbohydrates are usually digested with difficulty, but are sometimes well borne. With milk the most diverse results occur. In each case the diet is arrived at by experience. With regard to drugs, they have found **Bismuth** most generally useful.

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375); [2]*Jour. Amer. Med. Assoc.* 1914, ii, 200; [3]*Boston Med. and Surg. Jour.* 1913, ii, 741, 753, 754; [4]*Ibid.* 756; [5]*Austral. Med. Gaz.* 1914, 269; [6]*Ibid.* 247; [7]*Brit. Jour. Child. Dis.* 1914, 145 and 193.

DIPHTHERIA. (*See also* TRACHEOTOMY.) *E. W. Goodall, M.D.*

ETIOLOGY.—An outbreak due to *infected milk* occurred in the burgh of Troon in August, 1912. According to the account given by C. A. Bignold,[1] it was found that at one of the dairy farms the farmer's son had for three weeks been suffering from inflammation of the gums, which yielded pure cultures of diphtheria bacilli. Swabs were also taken from all the persons who had anything to do with the milk personally, and with one exception all contained the bacillus. Five of the cows were suffering, or had quite recently suffered, from a lesion of the teats, which, beginning as a vesicle, became a pustule, an ulcer, and a scab. From the sores of two of the cows diphtheria bacilli and staphylococci were obtained. It was impossible on the evidence to decide whether the cow or the farm-workers were first infected.

SYMPTOMS.—F. C. Knowles and L. D. Frescoln[2] have published an account of two cases of *cutaneous diphtheria* occurring in sisters, age 4 and 8 years, subjects of faucial diphtheria. The cutaneous lesion took the form of pustules and bullæ, varying from a pea to a pigeon's egg in size, and yielding diphtheria bacilli and staphylococci. The writers give a large number of references to the literature, from which it appears that diphtheria of the skin may occur in several forms, in addition to the false-membrane type: the ulcerative, gangrenous, eczematous, impetiginous, pustular, ecthymatous, vesicular, bullous, herpetiform, and abscesses.

A case of diphtheria (complicated by concurrent scarlet fever) in which *wasting of the right deltoid* occurred as a sequel, is reported by J. J. Jervis and V. C. Martyn.[3] The wasting was still present when the patient, a girl, age 7, left the hospital. The authors attributed it to the selective action of the toxin on the circumflex nerve.

TREATMENT.—J. Johnstone Jervis and V. C. Martyn[4] advise the administration of **Bicarbonate of Soda** and **Adrenalin Chloride** in severe cases of diphtheria. The former is recommended because in most cases "there seems to be a pronounced interference with fat metabolism in the liver, resulting in the appearance of diacetic acid and acetone, especially the latter, in the urine, which in consequence has a much enhanced acid value. . . . At the same time there is a marked accumulation of fat in all the organs, particularly in the heart, liver, and kidneys. . . . To this change, which is progressive, the vomiting, the irregularity of the heart, and its failure are probably due. The administration of bicarbonate of soda, subcutaneously, by mouth or by rectum, has certainly proved of great benefit in many of these cases, and in nearly all it has reduced the vomiting considerably." The drug is given in doses of 10 gr. to an ounce of water. Adrenalin is recommended, "not to raise the blood-pressure, but to keep it from falling. It is therefore given in small doses (5 to 10 min.

of 1–1000 adrenalin chloride) of constant strength at regular intervals from the very beginning of a case, and persevered with until the circulatory system has recovered its tone. It is a grave error to give adrenalin chloride or any other substance with a like action, towards the end of a case, or in large doses at occasional times only. To do this is simply to add to the load to be overcome by an already failing heart, and to run the risk of bringing the whole machinery to a sudden stop."

Insufflation of **Yatren** said to diminish risks of carrier spread (*p.* 37).

Wyville Thomson[5] sums up the advantages of **Intubation** over tracheotomy in laryngeal diphtheria, as follows: (1) In the great majority of cases it is much more easily performed; (2) No preliminary preparation is needed; (3) No anæsthetic is required; (4) Skilled assistance is not essential; (5) As there is no cutting and no subsequent scar, the consent of the parents is readily obtained; (6) The operation can be very rapidly performed, even with the patient in bed, and without good light; (7) In the great majority of cases it entirely relieves dyspnœa; (8) In those cases in which relief is not perfect, it may allow a sufficiency of air to enter; if dyspnœa is not relieved, no harm is done, and tracheotomy can then be performed; (9) The after-care, so important in tracheotomy, is a simple matter.

[Thomson recommends Bayeux's short tubes in preference to the longer ones of O'Dwyer. With this recommendation the reviewer agrees. But recently a great improvement has been made in the introducer. In both O'Dwyer's and Bayeux's instruments, the obturator (or pilot) is hinged, and there is not infrequently some trouble in removing the obturator from the tube when the latter is in the larynx. In Moreau's introducer this difficulty is obviated by the use of a very short obturator, which is most easily released by a simple mechanical arrangement. There is also an ingenious device in this instrument by which a whistle, situated in the handle, is blown when the tube is in position to insert in the larynx. The writer has given a short description of this instrument elsewhere.[6]—E. W. G.]

The method of administration of **Antitoxic Serum** usually employed is by subcutaneous injection, either in the lower abdomen or in the back. But of recent years, in consequence of the experimental work of Morgenroth and Levy, German clinicians have been using *intramuscular injection*; and in this country J. D. Rolleston and C. R. Macleod[7] have been giving the method a trial. These observers point out that according to Morgenroth and Levy's results, the highest antitoxic value in the blood is naturally found after intravenous injection, but that even after eight hours this concentration is found to have diminished, whereas in intramuscular injection, after eight hours the antitoxin value of the blood comes very close to that after intravenous injection. In four to five hours the antitoxin content with intramuscular injection is 5 to 20 times, and in seven to eight hours from 3 to 10 times, that after subcutaneous injection.

After a trial in 200 cases of diphtheria, Rolleston and Macleod

advise the use of the intramuscular method on the grounds: (1) That it is quite as simple as the subcutaneous method, ensures much more rapid absorption, is less painful, and less liable to give rise to abscesses at the injection site; (2) That it is superior to the intravenous method, not only in the greater simplicity of its technique, but also in the less rapid excretion of antitoxin after injection; and (3) That the more rapid absorption of antitoxin by the intramuscular route is shown, not by the effect on the faucial or laryngeal process, but by the lesser incidence of paralysis, especially of a severe kind.

The method of injection is as follows: Without preliminary washing, the outer side of the thigh in its middle third is painted with a 2 per cent solution of iodine, the needle is driven deep into the body of the vastus externus, and the injection is given in the ordinary way. Any amount up to 20,000 units (about 50 c.c.), can be given at one injection. After the injection, the puncture is again painted with the iodine solution and sealed with collodion. Serum phenomena (rashes, etc.) appear in about the same proportion of cases as after subcutaneous injection.

Several papers are to hand which deal with the method designed to get rid of diphtheria bacilli from the fauces by **Growths of Other Organisms,** 'over-riding' as it is termed. The organisms that have mostly been employed are *Staphylococcus aureus* and *lactic acid bacilli*, but the results reported are not encouraging. (See papers by Werner,[8] Goltz and Brodie,[9] and Nicholson and Hogan.[10]) Broeck[11] has made use of a thallophytic fungus, *Achlya muscaris*, and, as a result of preliminary investigation, believes that it has the power of destroying the bacillus of diphtheria both in cultures and in the throat. But more extensive observations are required.

References.—[1]*Pub. Health*, 1914, Aug. 380; [2]*Jour. Amer. Med. Assoc.* 1914, ii, 398; [3]*Brit. Med. Jour.* 1914, i, 859; [4]*Pract.* 1914, ii, 277; [5]*Ibid.* 258; [6]*Ibid.* 564; [7]*Met. Asyl. Bd. Ann. Rep.* 1913, 259; [8]*Jour. Amer. Med. Assoc.* 1913, ii, 2293; [9]*Ibid*, 1914, i, 1779; [10]*Ibid.* 510; [11]*Med. Rec.* 1914, i, 49.

DISLOCATIONS. (*See also* Knee, Internal Derangements of.)

F. W. Goyder, F.R.C.S.

Hardouin,[1] discussing posterior dislocations of the tibia at the knee, concludes that reposition is generally effected most easily not by direct extension, but by increasing the flexion, employing backward pressure at the ankle with one hand, while with the other, placed behind the upper end of the tibia, forward traction is made. Extension of the limb after this manœuvre may result in partial redislocation. This may be controlled by weight extension, the limb resting in a gutter splint. In a case so treated, subluxation no longer recurred at the end of fifteen days, and passive movements were begun, the weight being continued in the intervals for another ten days. In another week the patient was able to walk, and ultimately to resume his occupation as a jockey.

Turner Thomas,[2] reviewing eighteen operations for *recurrent dislocation of the shoulder*, has had excellent results from **Capsulorrhaphy** performed through an axillary incision behind the large vessels. His method is as follows: (1) The dislocation is reduced if possible, and the arm placed at a right angle with the body. (2) An incision 4 or 5 in. long is made where the posterior axillary fold fuses with the arm with its centre over the humeral head. This immediately exposes the tendon of the latissimus dorsi and the subscapularis muscle immediately above: the capsule lies in the interval between. (3) The circumflex nerve must be located at the humeral end of the interspace; after doing this, the subscapularis is retracted upwards and inwards, separating it from the capsule. (4) The anterior glenoid margin is located by palpation, and the capsule incised from upper to lower limit, midway between its scapular and humeral attachments. (5) Any loose body is removed, and the capsule closed in the following manner: the lower margin being drawn by means of three silk mattress sutures under the upper margin, these are drawn tight, left long, and clamped with forceps close to the capsule. (6) A tube is passed under the subscapularis to the capsule, and interrupted catgut stitches are put into the skin. (7) The arm is then approximated to the body and the skin stitches tied. (8) With the arm still closer to the body, the forceps are pushed onwards so as to tighten the sutures, and then removed along with the silk threads. (9) The wound is dressed and the arm bandaged to the side.

The operation takes about twenty minutes. The next day the dressing, soaked with joint and wound secretion, is changed, the tube removed, and the arm refixed to the side for ten to fourteen days. The overlapping of the capsule margins cannot be disturbed, because the arm never leaves the side till cicatricial union is complete. At the end of the third week the patient should begin to force the arm upward anteriorly; at the end of the fourth he must use as much force as he can actively; at the end of the fifth as much as he can passively. Out of 18 operations, 16 were successful, 1 was partly so, and 1 failed. Movements must be begun later in epileptic patients.

Armour[3] prefers excision of part of the capsule to plication. He advocates Clairmont's muscle-flap operation, the result of which is the practical deepening of the socket, by carrying a piece of the posterior border of the deltoid through the quadrilateral space from behind forwards, and fixing it in front so that it forms a sphincter-like ring round the neck of the humerus. Two incisions are necessary: one from the coracoid process parallel and slightly external to the anterior border of the deltoid, which is divided in the line of the incision 1 in. from its anterior border to expose the tendon of insertion of the pectoralis major, the upper half of which is divided $\frac{1}{2}$ in. from its insertion. Retraction of the long head of the biceps and of the short head with the coracobrachialis, exposes the insertions of the latissimus dorsi and teres major, with the posterior circumflex artery and circumflex nerve. These two tendons are also divided

in their upper half, half an inch from their insertion, thus enlarging the quadrilateral space. The posterior incision is made over the lower two-thirds of the posterior border of the deltoid. This border is exposed and carefully lifted up from the triceps. A portion as broad as three fingers is separated and detached from its insertion. This is then reflected up until the main trunk of the nerve is reached, and with its branch nerve, separated still further. The upper end of the outer head of the triceps is then detached from the humerus for an inch. This exposes the quadrilateral space. A curved forceps is then passed from the front through the quadrilateral space; the tip of the deltoid flap is grasped, and pulled round the surgical neck of the humerus without twist or tension; it is fixed to the edges of the wound in the anterior margin of the deltoid. The arm is kept at rest for two months. In two cases in which this operation was done after failure of capsulorrhaphy, one failed from insufficient fixation and over-tension of the flap, and too early movement. The other was a complete success.

Julius Cæsar[4] reports a simple and effective method of reducing dislocation at the shoulder joint, requiring only one assistant. The patient is placed on the ground in a sitting position. The surgeon grasps the wrist on the injured side, and the assistant does the same on the sound side. Both arms are then raised above the head, taking care to keep them parallel, and extending them upwards till the patient is just raised from the ground, when a click is heard and felt and the dislocation is reduced without further manipulation. In some cases of subscapular dislocation it may be necessary to rotate the arm externally to a slight degree while the trunk is still suspended by the arms.

Writing on a rational method of treatment for *congenital dislocation of the hip*, Sherman[5] says, "The stiff hips following operation in which the acetabulum is deepened led me to try manipulation; immediate instability of reduction made me incise. I found bunched-up capsule between the head and the socket; when this was cleared away, reposition became stable. Since reluxation occurred later in some cases due to distortion of the shaft, I adopted the following manœuvre, which increased my successful cases from 41 to 70 per cent. The capsule is the chief obstacle to reduction. The femoral neck is usually adequately long, but often directed forwards, and the femoral shaft is therefore twisted, except occasionally when the head is on the dorsum ilii. An incision is first made vertically down from the anterior superior spine between the long head of the rectus and the tensor fasciæ femoris; these muscles are separated to expose the capsule over the displaced head, which is incised freely in the same line. The hip is flexed and the gloved finger passed into the constriction, through which a long-bladed straight probe-pointed bistoury is guided. The capsule is freely cut downwards in order to avoid the femoral vessels until the finger reaches the acetabulum. With the hip still flexed, the head is replaced. The thigh is extended, abducted

70° to 75° and rotated inwards for 90°, then flexed at the knee. In this position the long head of the rectus prevents anterior reluxation. No suture of the capsule is necessary. The wound is closed, and the limb fixed in a double plaster-of-Paris spica for four to six weeks. If there is no rotation of the femoral shaft, no further operative interference is necessary. If internal rotation of the shaft exists, the plaster is removed, the limb still held in internal rotation, and a long nail driven into the femur below the trochanter. A subcutaneous osteotomy of the shaft is then done below the nail. The upper fragment is held by the nail, so that the head is in the acetabulum and the trochanter is in the proper transverse plane. The lower fragment is then rotated until the toes point from 15° to 20° outwards. Another double spica is applied, burying the nail. It is left on till the femur

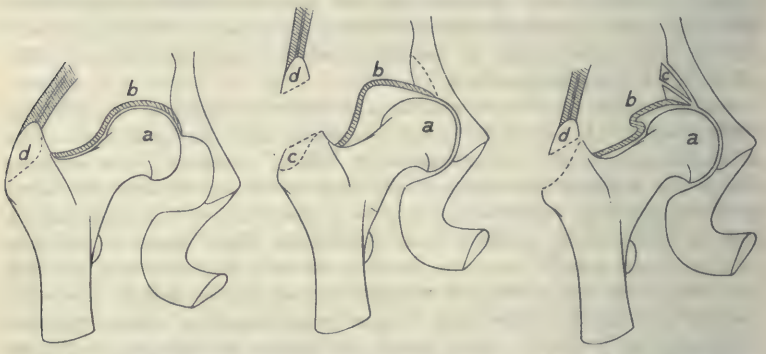


Fig. 23.—Albee's arthroplasty with the application of the bone wedge graft, for paralytic dislocation of the hip and cases of congenital dislocation when the head of the femur will not stay in the acetabulum on account of its shallowness and the absence of its rim. (*a*) represents the head of the femur before and after reduction. The capsule is shown much overstretched and the acetabular rim absent. The dotted line indicates bone section from just above the insertion of the joint capsule to the top of the joint; (*b*) shows the capsule reefed with silk sutures, and the postero-superior portion of the acetabular edge pulled downward, forming a lip to aid the shortened capsule in holding the head in place; (*c*) is a wedge-shaped graft from the great trochanter, or the crest of the tibia, placed in the cavity of the same contour between the cut surfaces of the new acetabular lip and the pelvis; (*d*) is the great trochanter sawn off with its muscles.

becomes firm. The nail itself is removed in four to six weeks. Subsequently, spicas are applied at intervals for eight to twelve months, each plaster being a little shorter than the last, and the abduction diminished. Walking is allowed three months after osteotomy.

Albee[6] has devised an operation for *relapsing congenital* and for *paralytic dislocation*. The hip is reached by a lateral incision and the turning up of the upper part of the great trochanter together with the attached muscles. The capsule of the superior part of the joint is defined but not incised. With a wide thin osteotome a broad bone incision about ½ to ⅝ in. above, and parallel with the superior edge of the acetabulum, is made obliquely down to the joint cartilage at a point about the same distance internal to the edge of the acetabulum. The overstretched portion of the capsule is reefed with silk in order to tip down the loosened edge of the acetabulum so as to form an

exaggerated rim. A wedge-shaped cavity in the bone is left above this. Into the gap is placed a wedge-shaped bone-graft from the tibia or the remaining portion of the trochanter. It is fixed in place by sutures of kangaroo tendon passed through drill-holes ; the trochanter is replaced and the wound closed (*see Fig.* 23).

Voluntary Intermittent Subluxation of Joints.—Bertein,[7] who has collected cases from the literature, believes that laxity of the capsule, usually but not always congenital, is the cause of these phenomena. These dislocations are of muscular origin and become reduced spontaneously when the contraction is relaxed. No deformity or abnormality can be detected when the muscles are at rest. The knee, the shoulder, and the hip are most commonly affected. In the first case the tibia is usually affected, occasionally one of the semilunar cartilages. At the shoulder, the head of the humerus is usually displaced backwards and a little downwards, from contraction of the posterior scapular muscles. This condition at the hip has usually been ascribed to extra-articular conditions ; while these are commonly present also, the symptoms seem to be due mainly to subluxation at the joint itself. The condition is not dangerous or painful. Pain or functional symptoms are either simulated or occur in nervous subjects. Treatment is usually unnecessary. Immobilization is the most effective therapeutic measure.

Outward Dislocations of the Patella.—Whitelock[8] advises open operation in this condition, which is most crippling in its effects, the ordinary treatment being unsatisfactory. Knock-knee, undue laxity of the ligaments, especially of the capsular, and a deficiency in the development of the external (lateral) ridge of the lateral condyle, all predispose not only to its occurrence but also to its recurrence. Sudden muscular contraction, with the leg extended or in moderate flexion, especially if the knee is turned in and the foot and leg are everted, is sufficient to cause the displacement. In acute cases, rupture of the tendinous structures on the outer side of the patella, particularly of the 'lateral patellar ligament,' will be found to have occurred, and suture is the most satisfactory treatment. In recurrent cases, reefing the medial side of the capsule and transplanting the insertion of the patellar ligament medialwards, have been practised, sometimes with good results. The patellar tendon has been split vertically and its outer half refixed on the inner side of the undetached inner half. The author advocates detachment of the gracilis tendon from its insertion and refixing it to the patellar ligament, stitching it in addition at intervals to the underlying joint capsule to prevent rotation or overstretching of the tendon.

REFERENCES.—[1]*Rev. de Chir.* 1914, i, 478 ; [2]*Surg. Gyn. and Obst.* 1914, i, 107 ; [3]*Liverp. Med.-Chir. Jour.* 1914, i, 100 ; [4]*Lancet*, 1914, i, 242 ; [5]*Surg. Gyn. and Obst.* 1914, i, 62 ; [6]*Ibid.* 699 ; [7]*Rev. de Chir.* 1914, ii, 51 ; [8]*Brit. Jour. Surg.* 1914, July, 6.

DUPUYTREN'S CONTRACTURE. (*See* HAND, SURGICAL AFFECTIONS OF.)

DUODENAL ULCER. (*See also* GASTRIC ULCER; POLYCYTHÆMIA.)

Robert Hutchison, M.D., F.R.C.P.

Wilkie,[1] from a post-mortem study of forty-one cases of duodenal ulcer, only six of which had been diagnosed during life, concludes: (1) Duodenal ulcer is a malady of frequent occurrence, and one which often passes unrecognized. (2) Although readily diagnosed as a rule, a chronic duodenal ulcer may occasionally exist and give rise to none of the characteristic symptoms, the first evidence of such a 'silent' ulcer being sometimes its perforation. (3) 'Silent' duodenal ulcers are met with most frequently in the subjects of arteriosclerosis, and are found for the most part on the posterior wall of the duodenum. (4) Some toxic or irritative factor, usually within the abdomen and most frequently associated with the colon or appendix, is found in a large proportion of cases of chronic duodenal ulcer. (5) Probably many acute duodenal ulcers are primarily follicular ulcers from the breaking down of inflamed lymph-follicles. (6) Whatever be the primary cause of a gastric or duodenal ulcer, spasm of the muscular coats of the viscus is an important factor in determining its chronicity.

(7) The situation of opposing ulcers on the anterior and posterior walls of the duodenum on the boundary zone of the areas supplied by the anterior and posterior branches of the supraduodenal artery suggests that a common vascular deficiency rather than a contact infection accounts for the peculiar tendency to chronicity and recurrence. (8) This vascular deficiency may be due to arteriosclerosis, but probably it is usually due to spasm of the muscular coats of the duodenum induced by a slight local anæmia consequent to strain on the supraduodenal vessels, this muscular spasm being favoured by the increased vagotonus and the irritable condition of the autonomic nervous system which exists in such cases.

(9) The sex incidence of duodenal ulcer may be explained on anatomical grounds. The relatively high pylorus and short fixed duodenum of the male allows of its vascular supporting ligament, the hepatoduodenal ligament, being exposed to strain, which in the female, with her relatively low pylorus and lax duodenum, is borne by the left border of the gastrohepatic omentum and lesser curvature of the stomach. (10) The fixity of the male duodenum further predisposes to kinking at the first duodenal angle, and thus to an unduly long exposure of its first part to the acid chyme from the stomach, undiluted by bile or pancreatic juice, the regurgitation of which is impeded.

Friedman[2] finds that the blood of patients suffering from non-bleeding duodenal ulcer differs from that in cases of gastric ulcer. In the latter, moderate anæmia is the rule and polycythæmia the exception; in duodenal ulcer the reverse is the case. In fifteen cases he found an average hæmoglobin percentage of 90 and a red-cell count of nearly 6,000,000. He is unable to explain the occurrence of this polycythæmia in cases of duodenal ulcer, but is convinced that it is of diagnostic value and is in many cases 'the only distinctive feature.'

REFERENCES.—[1]*Edin. Med. Jour.* 1914, ii, 196; [2]*Med. Rec.* 1914, i, 875.

DUODENUM, RUPTURE OF. (*See* ABDOMINAL INJURIES.)

DYSENTERY, AMŒBIC. (*See* AMŒBIASIS.)

DYSENTERY, BACILLARY. *Sir Leonard Rogers, M.D., F.R.C.P.*

J. G. Willmore and A. H. Savage[1] describe the diagnosis and serum treatment of epidemic bacillary dysentery at the El Tor pilgrim camp in Egypt (227 cases). They divide these into bacillary, amœbic, and mixed cases. Owing to the difficulties in isolating dysentery bacilli, especially in chronic cases, they have used the agglutination test as a diagnostic measure. The blood of each patient was tested against four different strains in dilutions of 1–20 and 1–40. In the lower one the blood often reacts to more than one type of dysentery bacilli. Plates are also made from the stools on MacConkey's medium, and dysentery bacilli sought for. If either dysentery bacilli or a positive agglutination test be obtained, the case is treated with **Polyvalent Anti-dysenteric Serum,** which is the only practical method in dealing with many cases. Occasionally, gangrenous amœbic dysentery, showing no amœbæ in the stools, may be difficult to diagnose from bacillary disease. The failure of serum treatment may help here to exclude the latter. In addition, bilharzial ova were found in twelve cases, and the *Balantidium coli* in thirty-two ; but as the latter was never found alone in genuine dysentery the authors are doubtful regarding its pathogenicity. Between 1909 and 1913, bacillary infection was found alone in 495 cases, mixed bacillary and amœbic in 157, and amœbic alone in 96.

R. H. Bahr[2] deals with the observations he made in the Fiji Islands in 1910, when 170 cases were studied, in only 11 of which were dysenteric amœbæ found. The epidemic bacillary disease affected all races in about equal degree. More than half the cases studied were among prisoners. Dysentery bacilli were isolated from the stools in 35 cases, and after death in 2 more. The Shiga-Kruse bacillus was most frequently found, but the Y bacillus of Hiss and Russell was almost as common, while a few agreed in their reactions with Strong's Philippine strain. After nine months' subculture the Shiga and Flexner types remained constant. Clinically the cases varied greatly, from a mild catarrhal condition to fulminating cases ending fatally in two or three days. The temperature varied from subnormal to 103° or over, but no relationship was found between the types of bacilli and the clinical symptoms. No hepatic complications were found, either during life or post mortem. Only one relapsing case was met with. In 74 per cent of the cases a positive agglutinating reaction was obtained with one or other of the dysentery organisms, but not before the sixth day of the disease. The eleven amœbic cases were more subacute or chronic and relapsing, while five of them showed hepatitis or liver abscess. The maximum prevalence of bacillary dysentery occurred during the hot wet months of December to March, at which season flies are especially plentiful. In only two out of many attempts were typical Shiga-Kruse bacilli isolated from the lower gut

of flies. Subsequently, numerous experiments were made in London to infect flies with dysentery bacilli without success, and no multiplication of the bacilli was found in the gut.

The treatment adopted in the first 53 cases was **Sodium Sulphate** in 1-dr. doses every hour for twenty-four hours, and then every four hours, with a mortality of 13·2 per cent. In a second series of 106, in 34 cases cyllin 20 to 30 min. in gelatin capsules three times a day was given in addition to the salines. In the remaining 72 cases 20 c.c. of the Lister Institute **Antidysenteric Serum** in adults, and 10 c.c. in children, was also administered intravenously, and in five very severe cases 50 to 70 c.c. were given. The mortality in this series was only 1·8 per cent, thus confirming Savage's work at El Tor. The average stay in hospital was also reduced in the second series to five days, as compared with eight in the saline cases without serum. In gangrenous cases he also advises the use of emetine hypodermically, as it may be very difficult to say at first if the case is bacillary or amœbic, and the drug is harmless in bacillary cases. H. E. S. Stiven,[3] in a paper on enteritis in a Turkish cholera camp, in a series of dysentery cases found the Shiga bacillus in 39 per cent, while no amœbic cases were detected. A low blood-pressure such as 62 to 64 mm. was of very bad prognostic significance. Treatment was carried on under great difficulties. Milk fermented with the **Lactic Acid Bacillus,** known locally as yaourt, appeared to do good, while in several cases 2-gr. pills of **Permanganate of Potash** had a beneficial effect.

R. T. Rodgers[4] deals with dysentery in the Raipur Gaol in the Central Provinces of India. He was not able to make bacteriological examinations, but examined all the stools microscopically. As amœbæ were only found once, and four out of five post-mortems showed lesions of bacillary dysentery, this appears to have been the common form, as is the rule in Indian gaols. In eight cases the patients had been prophylactically injected with Forster's Shiga vaccine without avail. Of two deaths (7·4 per cent), one succumbed to perforation of the large bowel five days after the second dose of vaccine; while the second died four days after the third dose. In about 30 per cent of the cases of dysentery treated with the vaccine a negative phase with increased symptoms was observed. Flagellate organisms, the *Trichomonas hominis*, were frequently met with in large numbers, and some cases gained weight steadily after being treated with **Methylene Blue**; but in three cases it had no effect on the organisms. He concludes that **Forster's Shiga Vaccine** gave good results both as a prophylactic and in the treatment of all but the most severe cases.

L. Rogers,[5] in a paper on the rational treatment of chronic bacillary dysentery, points out that in patients in Calcutta dying of this disease of over one month's duration, the lesions are usually limited to the lower half of the large gut, where medicated enemata are most likely to be efficient. He tested the effect of a large number of organic silver preparations and other antiseptics against the dysentery bacillus in the presence of chlorides and organic matter contained in broth

(which precipitates and renders almost inert silver nitrate), and found **Silver Gelatose (Albargin)** to be the most efficient. He has used this in a strength of 1 gr. in 1 oz., and in quantities of one and a half pints, once daily as an enema, in several cases of subacute and chronic bacillary dysentery, with promising results.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 1283; [2]*Ibid.* 1914, i, 294; [3]*Pract.* 1913, 860; [4]*Ind. Med. Gaz.* 1913, 424; [5]*Brit. Med. Jour.* 1913, ii, 1198.

DYSENTERY, PROTOZOAL. *Sir Leonard Rogers, M.D., F.R.C.P.*

A. Castellani[1] describes and illustrates what he believes to be a new form of protozoal parasite producing dysentery in man, which he found in three cases in Ceylon. Clinically they were an ordinary mild type of dysentery with abrupt onset and slight fever. Large oval active parasites were found, without flagella or cilia, but presenting a rapid peculiar vibrating movement, no distinct nucleus or differentiation of ento- and ectoplasm. Cultures could not be obtained.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1914, 65.

EAR, DISEASES OF. (*See also* OTOSCLEROSIS)

J. S. Fraser, M.B., F.R.C.S.

EXTERNAL EAR.

Othæmatoma.—Krüger[1] paints the swelling with **Tinct. Iodi Mit.** (*tinct. iodi*, B.P. 1898), aspirates the contents, and moulds a thin layer of cotton-wool over the inner surface of the auricle, all depressions being obliterated with forceps. Collodion is painted on, and should extend to the healthy skin. The author claims that this method renders it impossible for the effusion to re-form.

Boils in the External Meatus.—Lothrop[2] says that these are caused by infection of the hair follicles. They are extremely painful, because the sensitive skin in this region is firmly adherent to the underlying cartilage. There is great tenderness on manipulating the auricle, and great difficulty at times in excluding the presence of mastoiditis, though the hearing is not so much impaired as in otitis media. The inflammatory œdema surrounding the boil may spread and cause a swelling behind the ear or in front of the tragus. The usual treatment consists in the insertion of wicks soaked in carbolized glycerin, and **Incision** of the furuncle. Lothrop advises the use of **Alcohol** after cleansing the meatus. If the boil be ripe it should be incised; thereafter a wick of gauze is inserted and saturated with alcohol, and the patient is instructed to keep the wick wet by dropping alcohol upon it at frequent intervals. It should be removed daily and a fresh one inserted. Skillern[3] has successfully anæsthetized the auriculotemporal nerve with 2 per cent novocain and adrenalin, before incising a furuncle of the external meatus. The needle was inserted along the course of the nerve between the superficial temporal artery in front and the tragus behind. By opening the mouth, more room is gained, as the condyle of the lower jaw travels forward. This

method would appear to apply more to boils on the anterior wall of the meatus. In furuncles on the posterior wall the writer has not found it successful.—J. S F.]

EUSTACHIAN TUBE.

Hays[4] describes his pharyngoscope as an electrically lighted instrument, the optical portion of which is similar to the cystoscope. It can be used as a tongue depressor, the distal end being placed behind the soft palate. The patient closes his mouth and breathes through his nose. With the aid of this instrument, it is possible in difficult cases to pass the catheter exactly into the Eustachian orifice. By turning the lens down, one obtains a beautiful view of the larynx.

Walker-Wood[5] uses Holmes' naso-pharyngoscope, with which he is very satisfied. He has observed one case of total closure of the Eustachian tube, which was probably developmental. As a rule, it is due to syphilis. *Acute salpingitis* is associated with pain radiating to the ear, deafness and a feeling of stuffiness in the ear, low-pitched tinnitus, with 'popping' noises. On otoscopic examination, the membrane is reddened, and the naso-pharyngoscope shows that the mouth of the Eustachian tube is red, glazed, and swollen, and that the small vessels normally seen coursing over the Eustachian orifice are obscured. Obstruction usually occurs at the isthmus, where there is a collection of glands. *Chronic salpingitis* may be of either the simple or hypertrophic variety. In the latter condition there is considerable vascular turgescence of the mucous membrane, associated with constant low-pitched tinnitus. In atrophic salpingitis the mouth of the tube is patulous, and inflation is easily carried out by Valsalva's method. Patients suffer from autophonia, i.e., the sound of the speaker's voice is very loud and even painful in his own ear. *New growths* of the Eustachian tube are not common. Mucous polypi are occasionally seen. Malignant disease affecting the Eustachian tube is characterized by deafness, Eustachian obstruction with retracted tympanic membrane, severe trigeminal pain commencing in the third division of the fifth nerve, and swelling or paresis of the soft palate, probably due to paresis of the levator palati muscle. Nasal obstruction is a late and rarer sign.

The same writer holds that Yankauer's speculum is of great value in the direct treatment of the tubes. Gyergyai has described a new method of dilating the Eustachian tube, as far as the isthmus, by means of a dilator which is made from a cast of the tube. According to Holmes, 90 per cent of ear cases are due to disease of the Eustachian tube. Braislin advocates painting the tube with a 5 per cent solution of **Nitrate of Silver** in cases of swelling of the mucous membrane. Wood finds that cases of tinnitus are more responsive to treatment than those of deafness, but cases of otosclerosis, with wide tubes, do not give favourable results. Acute salpingitis can be successfully treated by painting the tube with a 30 per cent solution of **Argyrol** through Yankauer's speculum. In chronic catarrhal salpingitis,

PLATE XIX.

FRASER'S CASE OF ACUTE MIDDLE-EAR SUPPURATION

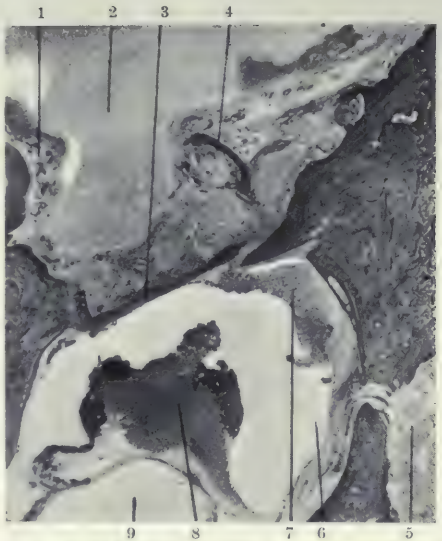


Fig. A—Horizontal section through left ear of present case (× 20 diam.). (1) Swollen mucosa over pyramid; (2) Pus in niche of oval window; (3) Footplate of stapes—to the right of this pus is seen entering the vestibule; (4) Anterior crus of stapes; (5) Internal meatus with pus cells (meningitis); (6) Cavity of ruptured sacculus; (7) Pus in perilymphatic space of vestibule; (8) Pus and hæmorrhage external to (9) The utriculus.

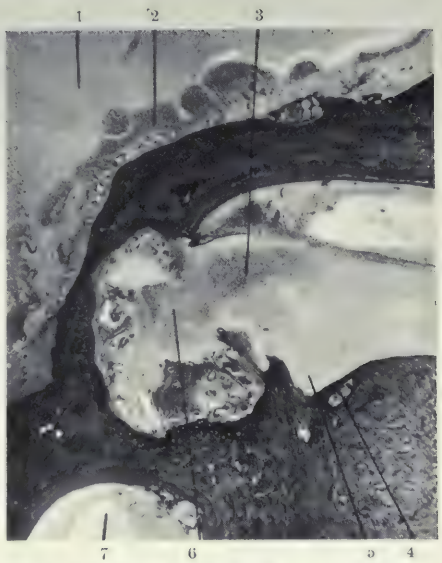


Fig. B.—Horizontal section through left ear of present case (× 20 diam.). (1) Pus in tympanic cavity; (2) Swollen mucosa over promontory; (3) Pus in scala tympani of basal coil; (4) Vein accompanying aqueduct of cochlea; (5) Pus in cochlear opening of perilymphatic aqueduct; (6) Pus in niche of round window—the central part of the round window membrane is infiltrated with pus; (7) Ampullary end of posterior canal.

PLATE XX.

FRASER'S CASE OF ACUTE MIDDLE-EAR SUPPURATION—*continued*

Fig. C.—Horizontal section through *right* ear of present case (× 20 diam.). (1) Hæmorrhage in perilymphatic space of vestibule external to saccule; (2) Pus in niche of oval window; (3) Footplate of stapes; (4) Hæmorrhage in posterior part of perilymphatic space of vestibule—the latter contains a large air-bell; (5) Utriculus, containing air-bell; (6) Hæmorrhage; (7) Ductus endolymphaticus; (8) Cavity of saccule.

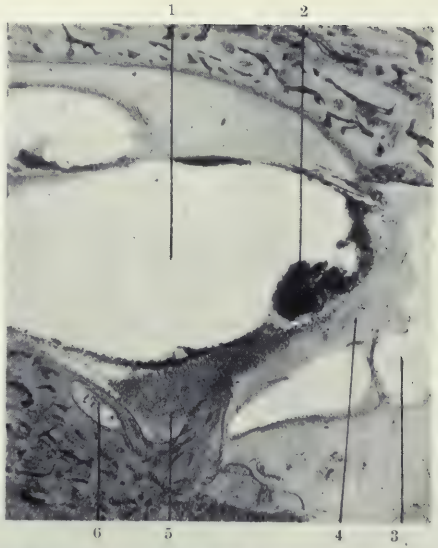


Fig. D.—Horizontal section through *right* ear of present case (× 20 diam.). (1) Scala tympani of basal coil; (2) Hæmorrhage above membrane of round window; (3) Niche of round window; (4) Swollen membrane of round window; (5) Pus in cochlear opening of perilymphatic aqueduct; (6) Vein accompanying cochlear aqueduct.

Wood uses a solution of **Zinc Chloride** (30 gr. to the ounce) or **Silver Nitrate** solution (1–16). Applications are made every second day by means of the naso-pharyngoscope and Eustachian applicator. In cases of chronic salpingitis with adhesions in Rosenmüller's fossa, it is advisable to clear out the fossa. Wood reminds us that the cavity formed by the radical mastoid operation may be reinfected from the naso-pharynx unless the tube be closed by curetting the mucous membrane with Yankauer's curettes. [The instruments devised by Professor Gustav Alexander are considerably more efficient than those of Yankauer.—J. S. F.]

MIDDLE EAR.

Acute Otitis Media.—Storath[6] states that acute otitis media, due to *Friedländer's bacillus*, is very like that due to *Streptococcus mucosus*. Both of these organisms are capsulated. As in the latter, there is an acute onset followed by a long interval with deafness and tinnitus, and then a complication suddenly appears. This, however, is more severe than in mucosus otitis. About three months, on the average, elapse between the first onset of the disease and the appearance of the complication. In more than half the cases the tympanic membrane did not rupture, or the trifling discharge ceased very early. Most observers now agree that a capsule protects an invading organism against the tissue defences, and so gives it additional virulence.

Ear Affections in Typhoid Fever.—Vergues[7] says that in the case of aural infections in typhoid fever the *external ear* may be affected by furunculosis, or by gangrene of the auricle. *Otitis media* occurred in 7 per cent of cases. Suppurative otitis media was twice as frequent as catarrhal. Pain is rarely a marked symptom, and when perforation of the membrane occurs it is usually in the anterior inferior quadrant. Otitis media is most frequent during the stage of recession. In none of the five cases investigated was *B. typhosus* found, the organisms present being those usually associated with acute middle-ear suppuration. Suppurative cases tend to run a subacute or chronic course. Pre-existing lesions in the nose or pharynx are predisposing causes. *Otitis interna* is a rare complication, occurring only once in 359 cases.

Fraser[8] records a case which shows that a child may suffer from acute middle-ear suppuration, acute purulent labyrinthitis, and leptomeningitis, without having any discharge from the ear—in other words, that the pus in the tympanic cavity may penetrate into the labyrinth through the round and oval windows, and from the labyrinth may infect the subarachnoid space before the purulent exudate in the tympanic cavity bursts through the tympanic membrane. (*See Plates XIX, XX.*)

The patient was a boy, age 12 years, who was apparently quite well till March 17, 1913, when he complained of severe earache and slight frontal headache. The patient vomited at 11 a.m., and choreic movements of the hands were noted. Vomiting continued on March 18 and 19, and he was very restless, and screamed if touched. On March 20 he became semi-

comatose. (A brother of the patient had recently committed suicide due to melancholia, brought on by severe deafness following chronic suppurative otitis). When the patient was examined on March 20, the temperature was 102·4°. There was conjugate deviation of the eyes to the left. The boy lay mostly on his right side and moaned constantly. Kernig's sign was present. The temperature rose to 103·4 at 7 p.m. Lumbar puncture yielded milky fluid under considerable pressure, containing many polymorphs and numerous capsulated diplococci (*Streptococcus mucosus capsulatus*). On March 21 the patient was quite unconscious, Cheyne-Stokes respiration supervened, and death occurred at 6 p.m. *Post mortem*, turbid cerebrospinal fluid was present at the base of the brain, with thick pus over the pons. The mastoid cells on both sides were filled with pus. The spinal cord also showed yellow purulent exudate. *Microscopic examination* of the left ear showed pus in the middle-ear cleft, and purulent infiltration of the left labyrinth—infection having occurred through the oval and round windows. Hæmorrhages were also present. The internal auditory meatus and the aqueduct of the cochlea contained pus. *Examination of the right ear* also showed pus in the middle-ear cleft, but no infiltration through the windows. Considerable hæmorrhage was present in the vestibule, and slight hæmorrhage in the basal coil of the cochlea. The condition in the right labyrinth appeared to be a preliminary stage to purulent labyrinthitis, and was probably of toxic origin.

The Schwartze Operation. — Hewat[9] has analyzed 200 consecutive cases in which this was performed by Logan Turner or Fraser, at the Edinburgh Royal Infirmary. The average age was twenty-three years. The right ear was affected in 112 cases, and the left in 88. The majority were attributed to influenza, sore throat, acute rhinitis, scarlet fever, and bathing. The duration of the otitis varied from three days to five months, and the average was five and a half weeks. The hearing before operation averaged—conversation voice at two and a half feet. As regards the indications for operation, superficial œdema or abscess was present in 140, and mastoid tenderness, combined with sagging of the meatal wall or bulging membrane, in 60 cases; 22 patients had symptoms suggesting an intracranial complication. As regards the important question as to whether mastoiditis alone can give rise to fever, Hewat divides the cases into four groups. These, however, may be reduced to two: (1) Cases with temperature under 100° before operation numbered 164; 10 of these had an intracranial complication. (2) 36 cases had a temperature above 100°; of these 12 had an intracranial complication, and 14 others were suffering from influenza, tonsillitis, or lung trouble. We thus see that there were only 10 cases with a temperature of over 100° for which no cause could be found except the ear condition. Bacteriological examination discovered a *streptococcus* in 49, *pneumococcus* in 19, *Str. mucosus capsulatus* in 2, *staphylococcus* in 10, *tubercle bacillus* in 1, mixed cultures in 36, and no growth in 15 cases.

As to the results: of the 200 patients, 164 were discharged cured. The average duration of the healing process was forty days, and 62 patients were healed in one month. The shortest period was seventeen days. With regard to the remaining 36 cases, the radical mastoid operation was found necessary in 13, in 2 a modified radical

operation was performed, in 6 cases the patient refused further operation. Four patients developed scarlet fever. In 10 cases there was a fatal termination, death being due in 9 to an intracranial condition which was present before operation, and in one case the fatal result was attributed to the effects of the anæsthetic. From these statistics it will be seen that the death-rate was 5 per cent. Seven patients died of meningitis, and of these one had also a cerebellar abscess. Two patients died of blood infection—septicæmia and pyæmia. Of the 164 cured cases, 106 reported for further examination. Of these, 58 had perfect hearing, 17 had as good hearing in the operated ear as in the other, 17 had worse hearing in the operated ear than in the other, and 14 cases could not be tested as they were too young. The tympanic membrane was normal in 80 cases; 4 patients stated that they had suffered since operation from earache and deafness, as a result of 'cold.'

Schwarz[10] obtained excellent results in *earache* from the inhalation of **Oleum Sinapis Æthereum.** Five grams of the oil are placed in a 20-gram bottle, the opening of which is held under the nostril on the affected side. The patient is instructed to close the mouth and eyes and to occlude the other nostril, and then to take a short strong sniff. The effect is 'immediate.' The cases treated include acute otitis media, furunculosis, and tinnitus.

Radical Mastoid Operation.—Haskins[11] thinks this must be classed as an exceedingly dangerous operation. He has not performed it upon a private patient during the past eight years. In hospital work, however, we have to deal with poverty, ignorance, filth, and superstition. Haskins has worked along the lines laid down by Nagle, who has reported on the results obtained by **vaccines** in 70 cases treated during the past four years. Of these, 60 have remained dry. In many of these the radical operation had been urged. Before employing autogenous vaccines, Haskins tries the effect of active cultures of the **Lactic Acid Bacillus** in cases of chronic suppuration. In preparing the **Vaccine,** Haskins first cleanses the external meatus with the vacuum cleaner, and then inserts for five minutes a pledget of cotton saturated with alcohol. If the perforation be large, a sterile platinum loop is introduced into the attic and the secretion at once transferred to blood-ascitic-agar plates. If the perforation be small, the pneumatic speculum is used to suck out the pus. The cases treated include aural polypi, cholesteatoma, and caries! Haskins has treated ten cases of mastoiditis, "all of which made prompt and complete recoveries." Of 33 cases treated, 23 have been cured. [The writer does not agree with Haskins' view as to the danger of the radical mastoid operation. In uncomplicated cases the mortality is less than 1 per cent.—J. S. F.]

Radiography of the Mastoid.—Lothrop[12] has examined 460 cases, and holds that the *x*-ray plate promises to be of great value, especially in differential diagnosis between an acute mastoiditis and an acute exacerbation of a chronic mastoiditis, as it differentiates between

a congested, though cellular, mastoid, and one in which it is sclerosed. A sclerosed or normal cellular mastoid can be made out in almost the poorest plate, but slight pathological changes in acute mastoiditis require a good radiogram. Both mastoids should be taken in all cases, for comparison. Lothrop found that 92 per cent of normal mastoids were cellular, while only 8 per cent were sclerosed. As confirming this he found that only 10 per cent of cases of acute suppurative otitis media showed a sclerosed mastoid process. In cases of chronic suppurative otitis media, on the other hand, a sclerotic mastoid was present in 94 per cent, and the remaining 6 per cent were semi-sclerotic. The normal cellular mastoid shows clear cellular spaces with well-defined thin partitions. Anterior to the cellular area there is a dense triangular surface—the petrous portion of the temporal bone. In front of the latter we have the ascending ramus of the lower jaw. Above the cellular area, we see the posterior route of the zygoma, and above this lies the middle cranial fossa. The zygomatic cells, when present, project above this line. The antrum in a cellular mastoid is rarely distinguishable from the other cells. The position of the lateral and sigmoid sinuses can generally be made out, but are not so distinct as in the sclerosed mastoid. In young subjects the cellular area is much restricted and the cells are generally smaller. Lothrop finds that there is a striking similarity between the two mastoids of the same individual.

In the majority of cases of acute otitis media the *x* rays show that the mastoid cells are affected simultaneously with the more anterior portions of the middle-ear cleft. In the first or congestive stage of acute otitis there is a loss of definition between the cell spaces and their partitions, as compared with the sound side. (This condition, however, may be simulated by other inflammatory conditions, such as furunculosis of the external meatus.) After six to ten days the picture changes in cases of virulent mastoiditis. There is now a distinct blurring of the mastoid structure, and the cell partitions can barely be made out. Later on, cases may show no cellular structure in any part, and even cavity-formation due to destruction of bone may be present. Perisinus abscess is sometimes diagnosed by the *x* rays, especially if it extend beyond the limits of the normal cellular mastoid. Lothrop claims that radiography has thrown light upon those cases of mastoiditis which do not come to operation in the acute stage. In these, radiograms showed an almost homogeneous shadow, and at operation a soft, bleeding, regenerating bone and granulation tissue were found. A good radiogram will show clearly the position of the sinus, especially in sclerosed mastoids, and so be of assistance to the surgeon. In some cases the anterior wall of the sinus can be seen projecting over the antrum. Lothrop further claims that by the use of the *x* rays a cholesteatoma cavity may sometimes be distinctly seen, and that in one instance a line of fracture through the mastoid was clearly visible in the plate, and was later demonstrated at operation.

Results of the Modified Radical Mastoid Operation.—Plummer and Mosher[13] record the results in seven cases operated upon in Boston, U.S.A., by Mr. Charles Heath (of London), in 1912. Heath selected the cases and carried out the after-treatment for a fortnight. Later the treatment was carried on by the writers. Four of the cases were acute and three chronic.

Of the acute cases, two were known to be dry, but the healing process, in the most favourable case, took seven weeks. In a third case the tympanic cavity was still discharging. Of the three chronic cases, two were still discharging at the end of seven months. Two of the seven had to be operated on again, and of these one is cured. The results as regards hearing do not appear to be any better than those obtained by the ordinary methods. The writers acknowledge that Heath might have obtained better results if he had been able to carry out the whole after-treatment himself, but remark that if Heath's operation is to be done by any one except himself the after-treatment must not be so difficult that men of average ability cannot attend to it. They hold that Heath's incision does not give access to the tip of the mastoid, or to the sigmoid sinus, and that although the operation cavity looks nice after operation, later on, when granulations spring up, they obscure a large part of the drum-head. In some cases the superior wall of the canal sags, and the meatal flap breaks from its moorings and projects forward so as to obscure the view. The writers believe that the three chronic cases did not do as well as they would have done had the radical mastoid operation been performed. In conclusion, Plummer and Mosher state that they are under great obligation to Heath for reviving the question of operating early, both in acute and chronic cases, in order to preserve as much of the hearing as possible.

(*See also* OTOSCLEROSIS.)

INTERNAL EAR.

The Indications for Labyrinthotomy.—Leidler[14] concludes that every diseased labyrinth, whether acute or chronic, which is associated with an otitic intracranial complication, must be operated on at once. Constant headache on the affected side must be considered as one of these intracranial complications. A diseased labyrinth, associated with symptoms of acute diffuse labyrinthitis (deafness, nystagmus of the third degree, and loss of caloric reaction) must at once be operated upon if the temperature is higher than 100·5° F., or the symptoms persist with at least the same intensity for more than four days. A labyrinth which is functionally destroyed must be operated on when the mastoid operation is performed if a fistula be present, or if there are persistent symptoms of irritation of the static labyrinth—giddiness, vomiting, and nystagmus. The mortality in the twenty-seven cases operated on in six years at Professor Alexander's clinic was 24 per cent. In several of the fatal cases the onset of the labyrinth symptoms took place shortly after the performance of a

radical mastoid operation, at which granulations or polypi were noted in the neighbourhood of the oval window.

Hoessli,[15] continuing his research on *occupational deafness experimentally produced*, concludes that air-conduction plays by far the greatest part in the production of occupational deafness, and that any interruption of this route tends to protect the terminations of the cochlear nerve. [The application of these researches would appear to be that boiler-makers, riveters, and others who work in a noise, should wear plugs of wool saturated with wax in their ears when at work, in order to delay, or even to obviate, the onset of occupational deafness.—J. S. F.]

Auditory Re-education.—Booth[16] states that the **Kinesiphone of Maurice** is an ingenious adaptation of the faradic battery to produce sounds like those of the human voice. The sound is produced by the vibration of platinum plates, the tension of which can be increased or diminished so as to raise or lower the pitch. The intensity of the sound can also be regulated by means of resistances. The sounds are transmitted to the ear by telephone receivers. There are three registers for low, middle, and high tones, and the sounds can be varied from 80 to 3500 vibrations per second—roughly corresponding to those of the human voice. The apparatus is worked by a six-volt accumulator. Maurice claims that he obtains 75 per cent of successes and only 5 per cent of failures, and that under his treatment tinnitus is relieved or disappears. He recommends that the intensity of the sound should be raised till the patient experiences a tickling sensation in the ear. The sittings should last from six to ten minutes, and should number fifty or more. Booth records three cases, two of which were fairly successful.

In the discussion which followed the reading of this paper, Gray stated that several of his patients had expressed a desire to try this treatment. He measured the hearing before they went, and again when they came back, and found that the two observations were almost exactly the same. He had never known anybody get any benefit, although some patients thought they were better. Kerr Love said that a Committee had been sitting for twenty years with the object of giving a prize to anybody who could devise an instrument which would really help deaf people. That Committee was *still sitting*. Porter had used the instrument of Zund Burguet in six cases, and of these three or four had obtained an improvement which could not merely be put down to suggestion or optimism. Barr had inspected the instrument, observed its application, and been unfavourably impressed with what he saw.

Raoult[17] gives a full account of thirty-five cases, seen six months after the cessation of treatment by auditory re-education. In a few of these the patients thought there was no improvement, while in others a slight diminution of the acquired hearing capacity was present. In the majority the improvement in hearing was maintained. Raoult holds that in severe cases of deafness treatment

should be resumed again after a period of rest. He lays great stress on general treatment of the patient. Lavrand[18] has tried phonatory massage in five intractable cases after failure with the usual classical methods, and shows encouraging results. He used the kinesiphone of Maurice.

Muecke[19] has worked with two of the **Auditory Re-education Machines** recently brought out, and has treated thirty-six cases. He states that the intensity of the sound should be gradually increased until the patient experiences a distinct 'tickling' sensation. This limit must not be passed, as actual pain and giddiness may be produced. Each sitting lasts from three to five minutes, and if, after fourteen consecutive sittings, no improvement is found, the treatment should be abandoned. Auditory re-education produces the following effects: (1) Vibration of the tympanic membrane; (2) Dilatation of the blood-vessels of the meatus and middle ear; (3) Stimulation of the nerve-endings in the labyrinth. Muecke has treated the following varieties of ear trouble: (1) Old suppurative otitis (no benefit obtained); (2) Cases with adhesions and scars (no benefit); (3) Chronic catarrhal otitis media (slight benefit, but results not so good as those obtained from the catheter); (4) Nerve deafness (no benefit); (5) Otosclerosis (some of these patients were temporarily helped as regards tinnitus). He believes that the main beneficial effect of the machine is due to vibration. The word 're-educator' goes for nothing. Of the thirty-six cases, only one was cured—a case of neurasthenic deafness. In conclusion, Muecke states that the results of his experience with auditory re-education have not been satisfactory.

Sudden Death During Bathing.—Guettick[20] holds that caloric stimulation of the labyrinth is often the cause of death during bathing. People with large perforations of the tympanic membrane are liable to giddiness, vomiting, nystagmus, and general collapse, when a small quantity of cold water is poured into the ear. Such persons may be drowned when they are suffering from collapse produced by the application of cold to the labyrinthine wall. The obvious precaution is the insertion of efficient plugs into the ears before bathing (*see* "Occupational Deafness," *supra*).

Radium.—Sohier Bryant[21] states that radium may either stimulate cell-growth or destroy cells. In hypertrophic and cicatricial states the destructive action of radium is desired; in atrophic states, the stimulating effect is wanted. The shallow, penetrating, slow α rays act only as a superficial destructive agent, and should therefore be eliminated by filters. The rapid γ rays penetrate deeply and break up into β rays, which are now considered the most important therapeutically. Bryant uses mesothorium bromide, because it is richest in β rays. The reaction of the individual must be carefully watched and the dosage nicely gauged. The application should always commence at a minimum and be gradually increased. The difficulty is that the effect of radium may be long delayed. Bryant employs a glass tube containing 5 mgrams of mesothorium bromide wrapped in thin tinfoil. The

applications are made in the external auditory meatus. According to Bryant, the practical indications for the use of radium include all forms of functional derangement of the ear, when the causal factors have been eliminated. He has treated such conditions as otosclerosis, middle-ear catarrh, the results of middle-ear suppuration, non-suppurative labyrinthitis, and hypertrophic middle-ear catarrh, and claims to have obtained improvement in sixteen out of twenty cases of which he gives details. All these patients had been under his observation for a number of years before radiation was employed.

Bárány's Symptom-Complex.—Bárány[22] describes the case of a girl, age 20, who had an acute otitis media in December, 1910. The condition healed, but left giddiness, pain at the back of the head, deafness and tinnitus. Examination revealed a normal drum-head, tenderness behind the mastoid process, deafness, impaired caloric reaction of the right vestibule, and deviation of the right hand outwards in the pointing test. Bárány considered that the condition was most probably one of localized collection of fluid in the cisterna pontis, i.e., the subarachnoid space, at the cerebello-pontine angle. He therefore drew off 3 c.c. of cerebrospinal fluid, which was clear, and not under tension. As Bárány expected, the headache thereafter became extreme, the vomiting continuous, and the giddiness intense and persistent. Bárány therefore exposed the dura of the right posterior fossa, and found it completely normal. This operation was followed by immediate cessation of all headache, giddiness and vomiting. The hearing also slightly improved, and some months later became absolutely normal. By this time, however, the same series of symptoms appeared on the left side. Bárány therefore exposed and slit up the fossa on the left side. The patient made a good recovery. Bárány is of opinion that the case was not due to hysteria, and explains that the eighth nerve lies within the cisterna pontis lateralis, and that immediately posterior to the eighth nerve we find the lateral choroid plexus, which is the source of secretion of the cerebrospinal fluid in this region. Bárány has now had a considerable number of cases similar to the one just described. He says some of them have had a sudden feeling as if something had broken at the back of the head, followed by sudden disappearance of the symptoms. In one case he gave **Atropine** with remarkably favourable result.

INTRACRANIAL COMPLICATIONS OF OTITIS MEDIA.

Oculomotor Paralysis of Otitic Origin.—Westmacott[23] states that inflammation commencing in the middle ear may spread by direct cellular continuity to the apex of the petrous portion of the temporal bone. A circumscribed meningitis may be set up, which results in pressure on nerves or infective toxæmia. Westmacott's case was that of a lady of 29, who had had discharge from the right ear for some years. She had a sudden attack of vertigo and vomiting, and was unconscious for sixteen hours. A week later, an ophthalmic surgeon

found complete paralysis of the third nerve on the right side, with ptosis. The external rectus and superior oblique muscles were unaffected, along with the seventh nerve. At operation it was found that the sigmoid sinus was far forward and the middle fossa low. The mastoid antrum contained pus and granulations, and there was an aperture in the roof through which pus exuded. This was enlarged, and a track was found extending inwards for more than half an inch. A gauze drain was inserted. On the fourth day after operation, the patient had a severe attack of general convulsions, and three days later the temperature rose to 101°, with frontal headache. Thereafter she made a slow recovery, and subsequent examination showed that a whisper could be heard at nine feet by the affected ear. The ptosis passed off, and only slight diplopia, on looking upwards, remained. The case was evidently one of extradural abscess in the floor of the middle fossa, the infection passing along the line of the superior petrosal sinus and affecting the trunk of the oculomotor nerve. Westmacott holds that immediate exploration is necessary when oculomotor paralysis exists with an ipsolateral otorrhea, accompanied by headache and vomiting.

Otitic Sinus Thrombosis.—Tovey[24] has analyzed 73 cases. Of these, 56 were due to acute, and 17 to chronic purulent otitis media. There was a septic temperature in 60 cases, 9 showed a variable temperature, while 4 had no fever. Rigors were present in 41 cases, chilly sensations in 19. Optic neuritis was noted in 12, and slight venous engorgement in 7 ; no optic change in 54. The diagnosis of sinus thrombosis was made before the mastoid operation in 32 cases, at the time of the operation in 11, and subsequently in 30. There were 61 recoveries, and 12 died.

Hugh E. Jones[25] states that there is a regular progression of events in septic infection of the sinus. A perisinus abscess may exist for a considerable period before the wall of the sinus succumbs. When the sinus wall is penetrated and a clot formed, the process may be arrested at the jugular foramen in one direction, and at the entrance of the superior petrosal sinus in the other—a firm clot with a small central abscess being the result. If the process extends backwards, once the clot reaches the horizontal sinus there is nothing to prevent it from extending to the torcular. If this becomes infected, infection of the other great sinuses is easy. When the sigmoid sinus is firmly clotted, extension is less likely to happen downward than backward. Jones believes that extension downwards, if it takes place at all, does so before the sigmoid clot is fully formed, or after disintegration of this clot has set in. There are thus five stations at which the natural progress of infection may be temporarily arrested : the sinus wall, the superior petrosal sinus, the entrance into the bulb, the exit from the bulb, and the junction of the internal jugular and facial vein. It is for the surgeon to determine what stage has been reached at the time of the operation. The occurrence of a rudimentary sinus on one side is admittedly rare (3 per cent), and doubtless, by the time

the necessity for ligation of the jugular vein arises, compensatory collateral circulation has been to some extent established.

With regard to **Operation,** Jones stated that in every case which showed symptoms suggesting perisinus abscess or the onset of pyæmia, the sigmoid sinus should be exposed with the least possible disturbance to its walls, until healthy wall was seen and the contents were judged to be fluid. This might involve the removal of bone up to or beyond the torcular, and down to the jugular foramen. Jones advised the following procedure : (1) If no disease was apparent, except the extradural abscess and healthy granulations springing from the sinus wall, and if only one rigor had occurred, it was advisable to wait. (2) If pyæmia was established but not severe, and there was a limited occluding clot in the sigmoid sinus, compression should be applied above and below the clot, the sinus opened and the clot removed, and the outer wall excised and the cavity packed with gauze. (3) If the sinus was obviously diseased, but its contents were partly fluid and the systemic symptoms marked, the internal jugular vein should be exposed in the neck. (4) Even if the sinus was not obviously diseased and the blood was fluid, with severe pyæmia, the internal jugular vein should be exposed and both sinus and vein occluded—the intervening part being drained and, if necessary, plugged. (5) If the sinus was clotted and the lower limit of diseased wall or clot could not be reached, the vein should be exposed in the neck.

The internal jugular vein, at its junction with the common facial, having been laid bare, several courses should be considered. (1) If the jugular vein was of normal size and looked healthy, it was best to compress it temporarily and remove the clot from the sinus down to the jugular foramen ; if there was a free flow of blood into the sinus, the sinus should be plugged after draining, and the neck wound should either be closed or provisional ligatures put in. (2) If the vein was collapsed above the facial, but healthy and full of blood below it, the vein should be tied in two places and divided above the facial, bringing the upper end into the wound. An endeavour should then be made to clear out the clot from the bulb by gentle irrigation. The same procedure should be adopted if the upper part of the vein was clotted. (3) If the clot in the jugular extended beyond the facial junction, it was better to tie and divide the internal jugular as low down in the neck as possible. The vein should then be dissected up, the tributaries tied off, and the greater part of the vein excised. The upper end should be brought into the wound. There was always a temptation to leave the vein unopened the first day, for fear of hæmorrhage. Jones, however, held that drainage from sinus to vein should be established at once.

Cerebellar Abscess.—Mann[26] has noted a marked disinclination of patients thus affected to use the limbs on the same side. This was tested by irritating the patient, e.g., by holding the nose. This symptom was not noted in cases of cerebral abscess.

Treatment of Otitic Brain Abscess.—McKernon[27] lays down the

following rules :—In acute and emergency cases, operate early, and do the entire operation at one sitting. In subacute cases the modified decompression operation of Ballance should be performed, with a wait of twenty-four to forty-eight hours after the dural incision, before exploring the brain. A large opening in the skull is essential. The knife only is to be used for incising brain tissue, and digital examination should be avoided. Irrigation should only be used in a chronic abscess with dense walls. McKernon recommends rubber tubing as a drain in chronic cases, and the cigarette drain in the acute type. Rise of temperature, or change in the mental condition of the patient, calls for an immediate inspection of the cavity, and a search for obstruction to drainage or development of additional foci. Rapidity in operation is essential to success.

References.—[1]*Münch. med. Woch.* 1914, No. 11 ; [2]*Boston Med. and Surg. Jour.* 1913, ii, 645 ; [3]*Ibid.* 503 ; [4]*Med. Rec.* 1914, i, 468 ; [5]*Jour. Laryngol.* 1913, 568 and 1914, 116 ; [6]*Arch. f. Ohrenheilk.* xciii, Heft 1 and 2 ; [7]*Rev. Hebdom. de Laryngol., d'Ont. et de Rhinol.* 1912, Sept. 28 ; [8]*Jour. Laryngol.* 1914, 284 ; [9]*Ibid.* 261 ; [10]*Monats. f. Ohrenheilk.* xlviii, No. 3 ; [11]*Amer. Jour. Surg.* 1914, ii, 253 ; [12]*Boston Med. and Surg. Jour.* 1914, i, 343 ; [13]*Ann. Otol.* 1914, Mar. ; [14]*Arch. f. Ohrenheilk.* xciii. 73 ; [15]*Monats. f. Ohrenheilk.* xlvii, No. 7 ; [16]*Jour. Laryngol.* 1914, 466 ; [17]*Arch. Internat. de Laryngol., d'Otol. et de Rhinol.* 1913, July–Oct. ; [18]*Ibid.* Aug. ; [19]*Jour. Laryngol.* 1914. 524 ; [20]*Med. Klin.* 1913, Nov. 16 ; [21]*Med. Rec.* 1914, ii, 376 ; [22]*Jour. Laryngol.* 1914, 2 ; [23]*Ibid.* 449 ; [24]*Ann. Otol., Rhinol. and Laryngol.* xxi, 362 ; [25]*Brit. Med. Jour.* 1914, ii, 402 ; [26]*Münch. med. Woch.* 1914, No. 16 ; [27]*Jour. Amer. Med. Assoc.* 1912, Sept. 21.

ECZEMA.

E. Graham Little, M.D., F.R.C.P.

Jamieson[1] is inclined to attribute the prevalence of eczema to the too frequent use of soap, and of water of too high a temperature. Moderate friction with a loofah in warmish water, not greatly hotter than the natural temperature of the surface of the body, i.e., 93°, is to be preferred to the prevalent use of hot baths with much soaping, especially for children. Turkish baths are still more to be deprecated. Alcohol and tea are both injurious to the nutrition, and should be allowed only in small quantities. Lime-water is recommended as the best diluent of the milk of infants, and eczema seldom appears in children so fed.

Jamieson introduced the **Boric Starch Poultice**, and lays stress on the value of it if properly prepared. His directions are as follows : "The starch which furnishes the best poultice is Glenfield starch. Of this four tablespoonfuls are taken, and a teaspoonful of powdered boric acid. Then a little cold water is poured on to form a paste, and to this a pint of boiling water is slowly added, and the whole stirred till it becomes a thick magma. Sometimes it is advisable to boil the starch for a few minutes to ensure a suitable consistence. The next direction is most important, but often omitted. The hot starch must be allowed to become perfectly cold. It should then present the appearance of a soft jelly. This is now spread to the thickness of three-quarters of an inch on pieces of cotton or linen

cloth, and the upper surface covered with butter muslin. This side is the one to be placed on the skin, adjusting it carefully to the sinuosities of the part. The poultice is now to be secured in position by a bandage; but on no account is any impervious material such as oil-silk or guttapercha tissue to be put over it. Such a poultice may be left undisturbed for several hours, even all night. When it is removed and a fresh one applied, the part should be gently wiped. In this way all crusts and morbid accumulations can be got rid of without damage to the skin, and all fœtid odours cease from troubling. Under the poultice the eczema may heal; but as a rule improvement can only thus be carried to a certain length, and other methods have to be resorted to. It is often a good plan to apply the poultices at night and use some other remedy during the day."

The best excipient for ointments is **Eucerin,** which is made in two forms, anhydrous and hydrated. The former is adapted for medication with substances in aqueous solution, the latter for pastes made with insoluble powders. **Crude Coal Tar** is a valuable remedy in a great many cases of moist and hyperæmic eczemas, but in some individuals it produces blistering, and should be applied with caution and over small areas until the patient is demonstrated to be free from the idiosyncrasy. When widespread eruptions are present, the patient should be kept in bed. If there is much oozing, a dusting powder of **Talc,** with 10 gr. of **Boric Acid** to the ounce, should be freely applied. Or the powder may be replaced by lotions, such as this: —

℞	Zinc. Carb.		Acid. Boric.	ʒj
	Cretæ Præcip.		Liq. Calc.	ad ℥viij
	Glycerini	āā ʒij		

If the eczema be a very dry form, the following is better:

℞	Bismuth. Oxychlorid.	ʒij	Ol. Olivæ	℥ij
	Cretæ Præparatæ	ʒij	Liq. Calc.	ad ℥viij

Arsenic should never be given to patients with eczema. **Antimonial Wine** is valuable in acute attacks, and **Iron** in anæmic and young patients. Of the native spas for balneotherapy, the preference is given to **Bath.** Harrogate is condemned except in very plethoric cases.

Gougerot[2] has some very wise hints on the management of eczema. "Primum non nocere" is a maxim to be followed, by exercising caution in using a new treatment for very small areas, and advancing from comparatively inactive to more active measures by gradual stages. In earlier phases of the eruption, when almost any local application is resented, the **Steam Spray** is the best sedative. Pure boiled water is sprayed on the parts for twenty minutes three times a day. A throat vaporizer is an efficient instrument for this purpose. On the limbs, bathing with water or the application of moist dressings may be substituted for the spray. These dressings should be in several thicknesses, and covered with impermeable tissue. They should be changed three times a day or oftener. Powders are applied

in the intervals of water treatment, talc and starch being recommended, the latter for surfaces, the former for folds such as the groin. Greases are as a rule ill tolerated in acute eczema, and lanolin and vaseline are especially mischievous. **Pure Non-benzoated Lard,** freshly prepared, is the best excipient, to which may be added an inert powder such as neutral **Subnitrate of Bismuth.** If the treatment outlined above succeeds, continue with it. If not, while persisting with the water applications, in the intervals of these a **Zinc Paste** composition may be tried, such as : Talc powder, oxide of zinc, and oil of sweet almonds in equal parts. Or **Tar** as it comes from the gas works, washed to free it from ammonia, should be applied, with the following precautions : The region of the body on which it is to be used should be prepared beforehand. If there are bullæ, they must be opened and the dead epidermis removed. If there is pus, or purulent serum, the eczema, even though aseptic, may be infected, and it is necessary to touch the exuding points with a watery solution of nitrate of silver (1 gr. of nitrate, 29 gr. of distilled water). After having allowed the nitrate to get dry, apply the tar with a flat brush, which painters call a cod's-tail brush. Apply a first layer, leave it a few minutes to dry, and then apply a second layer, which is left for an hour or two to dry ; then powder it over with talc and cover it with a cotton bandage to avoid stains from the tar. The next day undo the bandage, remove the scales, and look to see if there is any purulent serum left ; if there is, recommence a slight application of nitrate and put on another layer of tar. If the serum is seen to be pure, re-apply the tar, but do not touch with nitrate. Generally at the end of eight or twelve days the epidermis commences to be renewed, and the eczema is in a fair way of being cured." The tar may be removed with vaseline or sweet-almond oil.

When the inflammation has largely disappeared and there remains only a little redness and exudation, the whole surface should be swabbed over with 10 per cent **Silver Nitrate,** which is allowed to dry, and then the surface is covered with the zinc paste prescribed above. If the silver solution is not well tolerated, 1 per cent **Picric Acid,** or 1 per cent **Methylene Blue** in water, may be substituted. **Juniper Tar** may be added to the zinc cream in proportions of 15 to 20 per cent, or the pure tar may be painted on the parts, if the patient is remaining in-doors. In refractory late phases of the eruption, stronger reducing agents are required, and the following paste is advised :—

Sulphur precipitated and purified	to 1 gr.
Camphor	to 1 gr.
Salicylic acid	to 1 gr.
Deodorized juniper tar	10 gr.
Oxide of zinc	20 gr.
Talc	20 gr.
Oil of sweet almonds	10 gr.

For the use of **X Rays** in treatment, *see p.* 66.

References.—[1]*Edin. Med. Jour.* 1913, ii, 395 ; [2]*Univ. Med. Rec.* 1914, 481.

EMPYEMA. (*See* THORAX, SURGERY OF.)

For use of **Bismuth Paste,** *see p.* 4.

EMPYEMA IN CHILDREN. (*See also* THORAX, SURGERY OF.)

J. J. Perkins, M.B., F.R.C.P.

Dunlop,[1] reviewing his large experience of this condition, 98 cases in all, draws the following lessons. As regards the nature of the effusion, he finds that it may almost be taken for granted that a pleural effusion in a child under three years of age will be purulent; after three years this tendency is gradually lessened, until at the age of ten a serous effusion becomes the rule. The *pneumococcus* was present in pure culture in 53 per cent of his cases; a *streptococcus* in 16 per cent; *streptococcus* and *pneumococcus* mixed in 14 per cent; *B. tuberculosis* in 3 per cent only. He holds that the condition is a secondary one in the majority, 69 per cent of his cases being due to lobar pneumonia and 11 per cent to various infective diseases such as scarlet fever, measles or whooping-cough. Bronchopneumonia accounted for only 5 per cent.

In the metapneumonic cases the effusion occurred within a few days of the crisis, the symptoms in some cases being very marked—fever, cough, vomiting, and dyspnœa; but in older children the onset was more insidious, the child becoming languid, and suffering from cough and rapid emaciation. The symptoms which he finds most suggestive of the formation of an empyema are anæmia and, above everything, emaciation. He regards empyema as one of the most characteristic of the wasting diseases of children, often leading to a mistaken diagnosis of atrophy or tuberculosis which he regards as due to carelessness rather than to any real difficulties in diagnosis. In the cases of marked emaciation, fever is often completely absent. The physical signs are striking: in addition to absolute dullness at the base, loud tubular breathing is heard actually over the affected area. Vocal fremitus is of little value in childhood, and the distinction between an effusion and consolidation can often only be made by the aid of the exploring syringe, the use of which is also often necessary to discriminate between a serous and a purulent collection, a high temperature being as frequently found in the former as in the latter. Constitutional symptoms and especially emaciation, are much more marked in the case of an empyema.

The prognosis of the pneumococcal cases is much better than of the streptococcal, the commonest complication by far being purulent pericarditis, which was present in 40 per cent of the fatal cases. This condition should always be suspected if, in spite of satisfactory drainage, the general symptoms are unrelieved. The **Early Removal of the Pus** is the only satisfactory treatment, and the earlier the evacuation the less the chance of complications. Repeated aspiration has only been successful in his hands where the fluid has not advanced beyond the stage of turbid serum, though it is a useful measure in young infants unable to stand a more serious operation. As a rule, the choice

lies between **Resection** of rib and **Simple Incision** of the pleura, the latter procedure causing less shock, while the drainage is usually sufficient. Should it prove inefficient, resection can still be performed later. For many years resection was Dunlop's practice in all cases, but latterly he has had equally good results from simple incision. In young children it is safer to trust to a local anæsthetic, and the writer prefers the sixth interspace in the mid-axillary line as the site of election. He believes that the tube is often left too long *in situ* and causes a discharging sinus ; in many cases it can be removed in a week or ten days, and as a rule does not require to be retained longer than three or four weeks.

REFERENCE.—[1]*Edin. Med. Jour.* 1914, ii, 4.

ENDOCARDITIS, ULCERATIVE. *Carey Coombs, M.D., M.R.C.P.*

ETIOLOGY.—Kammerer and Wegner[1] record a case in which the organism infecting the cardiac valves was *Micrococcus flavus*, ordinarily a saprophytic inhabitant of the pharyngeal mucosa. Clinically their case resembled those described as 'endocarditis lenta' by Schottmüller—cases of infection of the heart by another organism of low virulence, akin to or identical with saprophytic organisms of the alimentary tract, *Streptococcus viridans*. In the case recorded by Smith and Richardson[2] the organism isolated from the blood during life was a Gram-positive streptococcus, which in sections of the infected valves appeared as a Gram-variable filamentous organism.

SYMPTOMS.—Libman,[3] who has already done much to define the group of cases referred to above as 'endocarditis lenta,' an ulcerative endocarditis of low virulence commonly due to infection with streptococci resembling those that normally inhabit the mouth and bowel, now describes a sub-group of these cases in which the circulating blood has become free from bacteria. It appears that this phenomenon should be regarded as an intermission in the course of the disease rather than an evidence of final recovery, for in one case at least recurrence of the infection took place after a bacteria-free interval of two years and a half. This is important from two points of view. First, it impresses the need of caution in basing a favourable prognosis in such cases on the disappearance of bacteria from the peripheral blood. Second, it suggests that some cases diagnosed as chronic valvular disease should rather be regarded as examples of chronic ulcerative endocarditis in a period of latency. In a case of apparent chronic valvular disease the following features should arouse a suspicion of valvular ulceration: marked progressive anæmia, brown pigmentation of the face, conspicuous evidence of renal disease, splenomegaly, and endocarditic phenomena (pyrexial periods, arthritic pains, petechiæ and other embolisms). In cases of what seems to be ordinary post-rheumatic sclerosis of the valves, if these symptoms be noted, a suspicion of ulcerative endocarditis must be entertained even when cultures from the peripheral blood yield negative

results. Libman records 21 cases of this kind, among which he includes reports of 4 patients who are still alive. In those who died, post-mortem examination disclosed the presence of healed ulcerations of the valves. It is not quite easy to account for the symptoms of progressive toxæmia exhibited by these cases, though in a certain number death was due to renal disease developing on an embolic basis.

REFERENCES.—[1]*Münch. med. Woch.* 1914, 588; [2]*Boston Med. and. Surg. Jour.* 1914, i, 204; [3]*Amer. Jour. Med. Sci.* 1913, ii, 625.

ENTERIC FEVER. (*See* TYPHOID FEVER.)

ENURESIS IN CHILDREN.

(*Vol.* 1914, *p.* 228)—Among the many useful hints given by Simpson, the following are worthy of repetition. The urine should be examined carefully; excess of acidity corrected by giving **Citrate of Soda**; if it is already alkaline, **Acid Phosphate of Soda** should be given till it is acid. If the urine is normal, a tonic may be given. In either case **Belladonna**, pushed steadily, is useful. He thinks children should be encouraged to retain their urine, even to the point of discomfort, during the day.

EPIDERMOLYSIS BULLOSA HEREDITARIA.

E. Graham Little, M.D., F.R.C.P.

Morley[1] reports a very remarkable group of cases of this rare disease occurring in several members of a family. In five generations in which 62 members of the family are included, there were 22 instances of the affection. Transmission seems to follow Mendelian rules of inheritance. A number of isolated instances of the disease are recorded, a fact which suggests that the origin in any family may be an example of a new character appearing by a process of discontinuous variation. The clinical symptoms include cyanosis and coldness of extremities, thin atrophic skin, blistering of parts of the body exposed to injuries which may be trivial, unhealthy excoriations and scars, and loss of nails. The combination of symptoms inclines the author to approximate this condition to the complex of symptoms seen in areas of divided peripheral nerves, in anæsthetic leprosy, in syringomyelia, in peripheral neuritis, and in poliomyelitis. It is, in short, a disease of some part of the trophic nervous system, a hereditary defect at the outset in some tissue or group of tissues. Treatment is for the most part of little avail. All that can be done is to protect the surface as much as possible from injuries, to promote circulation and warmth, and to keep injured areas as aseptic as possible.

REFERENCE.—[1]*Brit. Jour. Derm.* 1914, 35.

EPIDIDYMITIS. (*See also* GONORRHŒA; *and* TUBERCULOSIS, GENITAL.)

F. W. Goyder, F.R.C.S.

Eckels[1] warmly recommends **Epididymotomy,** not only for abscess, but in all cases of epididymitis. Immediate relief and lasting cure follow the operation. General anæsthesia is necessary. An incision is made over the most prominent part of the swelling, and the testicle

delivered. A small incision is made in the tunica vaginalis to allow of escape of fluid, and the swollen epididymis is punctured in numerous places with a blunt probe or grooved director. If pus is encountered, the puncture is enlarged with a knife, and a drain of strands of silkworm gut inserted. The testicle and scrotum are bathed with saline, the organ replaced, and the wound closed with the drain emerging at its lowest point. The drain is removed at the end of forty-eight hours. Knight[2] uses local anæsthesia, and punctures the epididymis with a large blunt-pointed needle. He confirms the good results obtained by Eckels.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1913, ii, 471; [2]*Ibid.* 1914, i, 351.

EPILEPSY. *Purves Stewart, M.D., F.R.C.P.*

TREATMENT.—Readers of the MEDICAL ANNUAL of 1913 and 1914 will recall the optimistic results claimed by Spangler in the treatment of epilepsy by **Crotalin** (the dried residue of the venom of the American rattlesnake, *Crotalus horridus*). The effects of this treatment, as recorded in Spangler's various papers, were so striking as to call for further observations by independent observers. Amongst these, Mays,[1] of Philadelphia, has published an article, in which he refers to 64 cases of epilepsy treated by crotalin injections. He claims to have obtained encouraging results when the drug was given in appropriate doses, the maximum being from $\frac{1}{100}$ gr. to $\frac{1}{50}$ gr. (Spangler has pushed it sometimes to $\frac{1}{25}$ gr. or more). Mays's statistics, however, cannot be considered seriously, inasmuch as he lumps together the number of fits of all his patients collectively in groups of 6 to 26 patients, before, during, and after the crotalin treatment, and then compares the gross totals of these groups of fits, claiming a diminution in the number of fits of 60 per cent in some groups, of 10 per cent in others. He tried crotalin both by itself and in combination with bromides, also with calcium lactate, but thought it was most efficient when given alone. No details of individual cases are given.

Spangler[2] writes on the method of preparation of the crotalin solution. Crotalin, being an albuminous substance, cannot be sterilized by heat; therefore the dried residue of the snake venom, dissolved in sterile water, must have some antiseptic added to it. He selects trikresol. Before filling ampoules with the solution he has bacteriological cultures made, so as to exclude microbic contamination. He starts with $\frac{1}{1000}$ gr., or sometimes $\frac{1}{6000}$ gr. as an initial dose, and now rarely finds it necessary to increase beyond $\frac{1}{75}$ gr. or $\frac{1}{50}$ gr. He has apparently discarded the higher doses that he formerly recommended. The strength of the dose is regulated not only by the local inflammatory reaction but by the amount of eosinophilia in the blood produced by each injection. So long as the eosinophilia reaches 8 to 10 per cent, the dose is not increased.

Independent observers elsewhere, however, draw a much less rosy picture of the effects of crotalin treatment of epilepsy. One danger

is that the crotalin may be contaminated by dangerous organisms. Thus Anderson,[3] of Washington, reports a case of epilepsy in a boy of 15, who was treated by a series of eighteen crotalin injections, beginning with $\frac{1}{200}$ gr. The patient soon acquired a tolerance for the venom which necessitated raising the dose in order to produce a local reaction. Thus, after receiving $\frac{1}{50}$ gr. on nine successive occasions, so little reaction was produced that it was increased to $\frac{1}{25}$ gr. for four doses, after which the last dose, $\frac{1}{20}$ gr., was given, which caused death five days later. A severe cellulitis developed in the arm, and, despite free incisions, this proved fatal. The infection was due to a capsulated organism found in the pus from the patient's arm, and also identified in cultures made from the remaining ampoules of crotalin solution. After this tragic result it was decided to investigate the sterility of the various solutions of crotalin bought in the ordinary way. Ninety-five ampoules of crotalin solution, prepared by four different firms, were then tested. Of these, 35 per cent were found to be non-sterile, the infecting organism being generally of an anaerobic character. In addition, twelve tablets of crotalin, sold for hypodermic use, were examined, and every tablet was found to be infected with an anaerobic organism, sometimes with more than one organism. The importance of these findings is realized when we remember that one of the effects of rattle-snake venom is to reduce or abolish the normal bactericidal power of the body fluids. Moreover, the local necrosis of tissue, induced by the specific action of the venom, favours the growth of anaerobic organisms, should such be present.

Yawger[4] made a number of observations upon epileptic patients in the Philadelphia epileptic hospital and colony, where the patients were under continuous skilled supervision, and also under most favourable hygienic surroundings. Six cases of idiopathic epilepsy were selected for three months' treatment by crotalin injections once a week, gradually increasing the dose. Careful records are given of each case. In order to avoid mere psychical effects, the purpose of the injections was not communicated to the patients. The results were, that of the six cases, two were uninfluenced, two were worse; another developed such severe cellulitis, with headache, nausea, and other toxic symptoms, that the injections had to be discontinued after six séances. In the sixth case, where the crotalin was administered at the urgent desire of the patient's relatives, the number of fits, which previous to treatment averaged thirteen per month, was twelve a month. In the midst of the course the patient had an insane period of three weeks, during which he was free from seizures. After the crotalin course was over, these insane periods recurred, also three series of major epileptic fits. The last series occurred two and a half months after treatment was stopped. During this last series, which was of two days' duration, sixty convulsions occurred, and the patient died.

Gordon[5] has made some interesting observations upon the treatment

of epilepsy by hypodermic injections of **Cerebrospinal Fluid** from another epileptic. He recalls the action of the cerebrospinal fluid as a carrier of toxic products to and from the central nervous system, and points out how the epileptic fit is possibly the result of a recurrent poisoning with some toxic substance of autogenetic origin. Moreover, it is well recognized that a simple diet and a quiet life, by reducing the formation of toxins, usually have a beneficial effect upon the frequency and severity of the seizures, even without medicinal treatment. What the exact nature is of this epileptogenic toxin is still undecided. Donath, in 1903, found that cholin was present in the cerebrospinal fluid of epileptics, and suggested that this substance might be one of the predominant morbid elements in the production of seizures. Ceni long ago observed that the blood-serum of one epileptic injected into the blood of another, occasionally gave satisfactory therapeutic results. He therefore concluded that the serum of one has a specific action on the serum of another. He also observed that the serum taken from one epileptic individual produced favourable results when injected into the blood of a second patient, and unfavourable results when injected into the blood of the third patient. The situation is, therefore, analogous to the effects of antiserums in other diseases. Ceni's studies in that direction have so far given no positive results, as he has not been able as yet to determine exactly the characteristics of the blood-serum which fit each individual case. The difficulty, in Gordon's judgment, lies in the complexity of the contents of the blood, and in the great variety of reactions of its constituent elements to various extraneous agents.

The cerebrospinal fluid does not present the complexity of the blood. It presents a medium which is easily accessible. It participates in infectious and toxic processes occurring in the organism. The existence of marked toxicity of the cerebrospinal fluid in epilepsy is well established. Gordon made the following interesting experiment: If one drop of blood from the finger of an epileptic patient be mixed with 15 drops of the cerebrospinal fluid from another epileptic, complete hæmolysis occurs. If, however, it is mixed with the same quantity of the patient's own cerebrospinal fluid (so Gordon states), no hæmolysis occurs. Apparently the cerebrospinal fluid of each patient contains poisonous elements which are antagonistic to each other's blood but not to his own blood. Applying this principle to the treatment of epilepsy, Gordon selected two severe epileptics, in whom ordinary treatment by bromides, etc., had been of no avail. From each patient 30 c.c. of cerebrospinal fluid were withdrawn. The fluid of one patient was used for the treatment of the other, and vice versa. Three c.c. of fluid were injected hypodermically at intervals of three days. Bromides were continued as before. During the first two weeks both patients were free from attacks. The supply of cerebrospinal fluid was then exhausted, and the fits began to recur, although milder in degree

and of minor instead of major type. The injections were therefore resumed in large doses (5 c.c. twice a week) for ten months. The improvement continued, the intervals between the fits increased, the major attacks ceased, and the mentality and general health of the patients improved. Finally, the bromides were discontinued, without the cases relapsing. Similar treatment was then undertaken in two more cases. In one of them, a little girl of 11 years, no cerebrospinal fluid was withdrawn, so that mere withdrawal of fluid could not be a factor in her improvement. In the other, a man of 39, the treatment was carried out in conjunction with lumbar punctures according to the original routine. Both of these patients were observed for over eight months, and both showed similar improvement as regards diminution in frequency of fits, although the seizures remained major in type. It was noticed that when the original epileptic, whose cerebrospinal fluid was used for injection, showed marked improvement, his fluid was no longer so efficient in controlling the fits of other patients ; but if the fluid was obtained when the original epileptic had a recurrence of attacks, it again became efficient. The foregoing observations are of interest, and demand further investigation to determine their true value.

Returning to bromide medication, which in epilepsy is still our sheet-anchor, especially when combined with a salt-free or salt-poor diet, encouraging results have recently been recorded from the use of **Sedobrol,** which is manufactured in small tablets. One or two of these tablets are dissolved in a cup of hot water. Each tablet weighs 2 grams and contains 1·1 gram (16 gr.) of sodium bromide, with small quantities of sodium chloride, vegetable albuminous extractives made from some twenty different plants, also a proportion of fat. The resulting bouillon has an excellent flavour, and is readily taken by patients in the place of ordinary soup. This bouillon is given twice a day, at nights. The number of tablets prescribed is from one to four, generally two, daily. Donath[6] has published a series of nine cases in which treatment by sedobrol was employed with encouraging results. The attacks promptly diminished both in frequency and intensity. Sometimes major attacks were replaced by petit mal of the mildest variety. In one case, however, the patient, who had shown considerable improvement during two months of sedobrol treatment, was discharged from hospital ; but on returning for a second course he developed maniacal symptoms, and had to be transferred to an asylum. In another patient, who had previously been treated for seven months by means of luminal, sedobrol produced a bromide rash, and at the patient's wish the treatment by **Luminal** was resumed. Schulhof[7] records a series of epileptic cases treated by sedobrol, and comes to the conclusion that the cases for which it is best suited are those in which the seizures are not preceded or followed by mental symptoms, such as dullness or confusion. The number of seizures in most cases showed a remarkable diminution,

but where mental symptoms were associated, these sometimes became exaggerated, despite the diminution in the number of the epileptic fits.

References.—[1]*Med. Rec.* 1914, i, 105; [2]*N. Y. Med. Jour.* 1913, ii, 651; [3]*Jour. Amer. Med. Assoc.* 1914, i, 813; [4]*Ibid.* 1533; [5]*N. Y. Med. Jour.* 1914, i, 110; [6]*Wien. klin. Woch.* 1914, 182; [7]*Ibid.* 701.

E. W. Hey Groves, M.S., F.R.C.S.

Since the introduction of modern surgical methods, the operative treatment of epilepsy has occupied the attention of many, and from time to time figures have been produced to prove that decompression is always followed by amelioration of the symptoms; but general surgical opinion has never accepted this view, and there is now a tendency to veer to the other extreme, and to regard operative treatment of epilepsy as always useless. Therefore the careful work of Thorburn[1] on this subject is much to be welcomed. He begins by remarking that it is important to note that temporary improvement often occurs in epilepsy after any operation, e.g., that for a hernia, or after a severe trauma such as a burn. This fact accounts for the apparent success of such measures as oophorectomy or excision of the sympathetic, and it also explains the exaggerated benefit which some authors have attached to cranial decompression. It is useless to describe the results of these operations until a considerable period has elapsed, preferably two years.

Thorburn's cases are 39 in number. Of these, 1 died, 14 were untraced, and 24 were traced up to date. It is first to be noted that these operations have a very low mortality. Of the 24 cases, 19 had been operated upon more than two years, and of these, 5 were cured and 6 were greatly improved. Thus it may be said that half the cases are greatly benefited by the operation and about one-quarter cured. But this list contains cases both of idiopathic and traumatic epilepsy, and the author, from his experience, emphatically declares that it is quite useless to operate upon the former. The disease must be definitely traumatic in origin and focal in distribution, to hold out any hopes of operative success.

The operation itself consists in a free removal of bone over the affected cortical area. This bone is usually much thickened, and sometimes there are spicules projecting from it into the brain beneath. Adhesions of the membranes to the brain are separated, and their re-formation prevented by the use of gold foil or Cargile's membrane. Cysts are often encountered. The bone is not replaced, and there is no trouble to be anticipated from the defect. One case is mentioned of exceptional interest. A soldier in the Boer War was shot through the head over the motor cortex, and developed hemiplegia and epilepsy. On removing the bone between the wounds of entry and exit, the cortex was found to be blackened. The blackened strip was removed for the extent of about 1 × 4 inches. The patient made a

good recovery, has never had any return of epilepsy, and the motor power gradually returned.

See also p. 58, for notes as to the value of radiography of the sella turcica.

REFERENCE.—[1]*Med. Chron.* Ap. 1914, 2.

EPITHELIOMA ADENOIDES CYSTICUM.

E. Graham Little, M.D., F.R.C.P.

The nature and place in nosology of this rare disease have been greatly discussed, with as yet no consensus of agreement ; but recent views undoubtedly approximate it to the more benign types of rodent ulcer. Graham Little[1] reports two cases in which the diagnosis between multiple rodent ulcer and epithelioma adenoides cysticum remained difficult, if not doubtful. A shorter appellation which indicates the site of the growth, namely tricho-epithelioma, was proposed by Jarisch, epithelioma being used by him in the Continental sense of any epithelial tumour. The disease usually occurs in several members of a family, is congenital, or appears soon after birth or in early adult life, and consists essentially in the eruption of numerous tumours which have a special predilection for the face, but also are not infrequently met with on the chest. The tumours for the most part are semi-translucent waxy growths, with no tendency to ulceration, and seldom exceeding in size the area covered by a sixpence. Histologically, the growths are seen to arise more particularly from the epithelium of the hair follicle, and very extensive islands and peninsulas of epithelial tissue may be found in the superficial zones of the corium, but never with any dissemination of epithelial cells as in malignant epitheliomata. Both clinically and histologically, multiple rodent-ulcer tumours may so closely resemble this condition that differentiation in the present state of our knowledge may be impossible. *Plate XXI* illustrates such a case, being the second of the two noted above as reported by Graham Little.

The growths, if not too numerous, can be removed by freezing with **Carbon-dioxide Snow,** and do not tend to recur. Usually, however, their number is too large, and their nature too benign, to warrant interference.

REFERENCE.—[1]*Brit. Jour. Derm.* 1914, May.

EPITHELIOMATA OF THE SKIN. *E. Graham Little, M.D., F.R.C.P.*

Seelye[1] describes a personal method he has found of marked advantage in the treatment of cancerous ulcers. He focuses **Sunlight,** by means of a reading lens, on the affected part. He gives the following detailed description of the manipulations used :—

" The technique is to focus the clear sunlight directly on the sore for ten or fifteen minutes at a sitting. If a scab is present, I concentrate the rays on it till the patient complains of the burning, then quickly lengthen the focus so as to cover with the rays an area an eighth of an inch or more beyond the scab. Every few minutes I

PLATE XXI.

EPITHELIOMA ADENOIDES CYSTICUM

E. Graham Little, M.D.

induce the burning again for a second, not to the degree of cauterization, and then apply more mildly. After about ten minutes' treatment, the scab will look darker, and during the next few days will become more prominent and loosened. Treatment should be given every day or two till the scab may be easily removed, leaving a raw bleeding ulcer. Then is the time for a powerful application of the rays. First apply a few granules of cocaine in powder directly to the raw sore, and, after three or four minutes, a treatment so strong as almost to cauterize the base of the ulcer may be borne, to be alternated with continued milder applications for about fifteen minutes. Rarely are more than eight to fifteen treatments required to get satisfactory results. Any ordinary dusting powder such as talcum, boric acid, or bismuth may be sprinkled over the scab at any time for cosmetic purposes, or to dry a moist surface."

X Rays are discussed in treatment (*p.* 60); **Secondary Radiation** from silver and copper (*p.* 64); and **Radium** (*p.* 68).

REFERENCE.—[1]*N.Y. Med. Jour.* 1914, i, 279.

ERYSIPELAS. *E. Graham Little, M.D., F.R.C.P.*

Erdman draws from the observation of 800 cases of this disease a series of conclusions. Uncomplicated facial erysipelas in 500 cases averaged 6·7 days. The disease located elsewhere than on the face, or when occurring on the face but complicated with concurrent disease, averaged two weeks. The temperature was usually high in facial cases, from 102° to 104°, or even higher, and the curve resembled that of lobar pneumonia, being maintained for five to seven days, and falling by lysis. In only 8 cases was there no fever. Males were twice as frequent as females. Cases were about three times as numerous in the winter as in the summer. Eight per cent of the cases occurred in children under two years of age; 88 per cent in adults aged from twenty to fifty-five.

Facial erysipelas constituted seven-eighths of the cases, and the entry of the infection was almost always traceable to the nasal mucosa. Chills, headache, malaise, and rise of temperature usually precede the skin symptoms by twelve to twenty-four hours. Pneumonia and nephritis were frequent complications. In more than 10 per cent of the cases there was a history of recurrences, sometimes as many as six attacks being noted in the same patient. The disease did not appear any more easily communicable than streptococcus and staphylococcus infections of wounds.

In only 4 of the 800 cases was there any history of infection. Ninety-three deaths occurred in 800 cases. Of these, 40 per cent were in children under two years. Body localizations contributed 50 per cent of fatal cases, facial cases only 5·3 per cent, and of the latter the mortality was far higher in males than in females, a fact to be attributed to the greater sobriety of females.

Facial erysipelas is distinguished by fever, early bleb formation, and desquamation. These characters are less conspicuous in other

distributions of the disease, and it is often impossible to differentiate it from cellulitis and lymphangitis. Internal medication was little used ; iron in particular, which is so often prescribed, seemed to do more harm than good. In the great majority of cases the only treatment was the application of continually wet **Cold Compresses** wrung out of iced **Boric Acid Lotions.** Where large areas were involved, dressings were dispensed with. Ichthyol, widely recommended as it is, proved useless. In 95 cases out of the 800, **Vaccine** treatment was used, and in these the mortality was almost exactly the same as that for the whole series, namely 11·5 as compared with 11·62.

Phylacogen said to be highly efficient (*p.* 26).

ERYTHEMA NODOSUM. (*See also* TUBERCULOSIS, ACUTE GENERAL.)

E. Graham Little, M.D., F.R.C.P.

Landouzy,[1] who has long claimed that erythema nodosum is the product of a ' septicæmia ' due to the tubercle bacillus, publishes a case in which he has demonstrated the part played by this organism. The patient, a woman, aged 27, had typical erythema nodosum. She had a concurrent endocarditis, and physical signs of phthisis. She gave a positive cutaneous reaction to tuberculin inoculation. The blood was sterile, and when inoculated into the peritoneum of the guinea-pig produced no result. One of the nodules was excised at the height of development, and histological examination of this revealed the presence of a bacillus identified by staining reactions as Koch's bacillus, while inoculation of the second half of the excised nodule produced tuberculous lesions in a guinea-pig, numerous bacilli of tubercle being recovered from the swelling which resulted at the site of inoculation. The author does not maintain that all cases clinically deserving the description of erythema nodosum are tuberculous in origin, but regards the majority as due to this cause.

Odery Symes[2] agrees with Landouzy as to the frequent evidence of tubercle in erythema nodosum. He reports six cases of a series of twenty in which there was such evidence. The rash may be a simple accompaniment of some chronic tuberculous lesion in lungs, joints, or glands, and is probably in that case of toxic origin ; or the erythema nodosum swellings may be due to an actual invasion of the skin by tubercle bacilli ; or it is not infrequently a prodromal symptom of an acute tuberculous septicæmia, generally ending in a fatal meningitis. Histological examination of one of his cases failed to show actual bacilli, but the general aspect of the section which contained giant cells of a type common in tuberculous tissue was confirmatory of that diagnosis. Bacilli were demonstrated in numerous caseous mediastinal glands. Pollack obtained a positive result in 100 per cent of his cases of erythema nodosum with von Pirquet tests ; and Moro, with his own test and von Pirquet's combined, obtained in 88 per cent of 30 cases a reaction indicative of tuberculosis. Symes

considers that erythema nodosum is a distinct clinical entity, but that other erythematous nodular rashes have been included under the same name, some of which are of tuberculous causation.

REFERENCES.—[1]*Presse Méd.* 1913, 941 ; [2]*Brit. Med. Jour.* 1914, i, 909.

EUSTACHIAN TUBE. (*See* EAR, DISEASES OF.)

EYE, GENERAL THERAPEUTICS OF. *A. Hugh Thompson, M.D.*

Local Anæsthesia in Eye Surgery.—Siegrist's method of deep injections was described in last year's MEDICAL ANNUAL (p. 234). Pooley[1] employs a method very similar to that of the Swiss surgeon. For these deep injections, some anæsthetic less toxic than cocaine is desirable. Novocain has been employed. Pooley uses a 1 per cent solution of **Alypin** in normal saline with a drop of 1–1000 **Adrenalin Chloride** solution added. He injects 15 to 60 min. or more, according to the severity of the case, injecting it deeply with a long straight needle in the direction of the posterior pole of the eyeball. He has found the method especially useful to produce anæsthesia while removing pieces of steel from the eyeball with the magnet, or iridectomy when the iris is inflamed, for evisceration, and for cataract in nervous patients.

As an adjunct to local anæsthesia in nervous and restless patients, Ramsay[2] recommends the injection of a dose of **Omnopon-Scopolamine.** Omnopon is a soluble preparation of the alkaloids of opium. The average dose for an adult is $\frac{2}{3}$ gr. with $\frac{1}{150}$ gr. of scopolamine ; for young subjects half this amount. The patient should be prepared as for a general anæsthesia, and the dose be injected into the gluteal muscles an hour and a half before operation. He should then be allowed to go to sleep quietly. He wakes up when moved into the operating-room, but continues drowsy both during and after the operation. In Ramsay's experience, the method has been least satisfactory in cataract operations, as it makes the patient so drowsy that the eyeball constantly tends to roll upwards. When the operation allows of the use of the fixation forceps throughout, the method is without any such drawback.

Ethyl-Hydrocupreine, a new salt of quinine, is said to have a specific action on the pneumococcus. The specific action of the drug was worked out by Morgenroth in Germany, and good results from its use were first reported from clinics at Leipzig and Tübingen.[3] Wiener,[4] of New York, reports astonishing success from its use in a case of severe hypopyon ulcer. A 1 per cent solution was used to bathe the eye hourly for six hours during the first day and for twelve during the second. The result was a rapid and complete cure.

There is no doubt that **Salvarsan** and **Neosalvarsan** have come to stay, and though there was difficulty in obtaining reliable preparations of the drugs at the beginning of the war, these hindrances were only temporary. No injury to the healthy eye by these remedies has been proved. In syphilitic eye disease a favourable result is to be expected

in iritis, choroiditis, retinitis, neuritis, and in paralysis of the ocular muscles. In interstitial keratitis its effect is doubtful, and in optic atrophy, in the opinion of most authorities, it is contra-indicated. Many cases have been reported of syphilitic eyes having got worse after single injections of salvarsan, but the available evidence goes to show that this result was not due to the remedy but to the disease (McAdams)[5].

REFERENCES.—[1]*Ophthalmoscope*, 1914, 464; [2]*Lancet*, 1914, i, 1181; [3]*Klin. Monatsbl. f. Augenheilk.* 1913, Oct. and Nov.; [4]*Med. Rec.* 1914, i, 114; [5]*Boston Med. and Surg. Jour.* 1914, i, 308.

EYE, INJURIES TO THE. *A. Hugh Thompson, M.D.*

The question of **Excision of the Eye** in cases of injury is discussed by Hepburn.[1] The subject, he says, divides itself into four parts, namely: (1) Excision of the eye immediately or within a day or two of the accident; (2) Postponement of excision, and the line of treatment to be adopted in the interval; (3) Indications for excision after temporizing for a certain period; (4) Excision when the presence of sympathetic ophthalmia has become definitely established.

With regard to (1), the only cases where immediate excision should be carried out are those where the condition of the injured eye is obviously hopeless, or where it at once begins to suppurate. In all other cases, even when the so-called dangerous area is involved, an attempt should be made to save it. The treatment to be adopted must be immediate and decided. In cases where there is the possibility of a magnetizable foreign body having penetrated the globe, the Haab magnet, if available, should be employed. If the iris is incarcerated, it should be excised freely. If the lens is injured and the lens matter is becoming opaque, it must be removed by means of a curette, or washing out the anterior chamber at the earliest possible moment, an injected eye being no contra-indication for such a procedure. If there is a foreign body which cannot be removed, if the eye does not quiet down within a reasonable time, that is an indication for excision; but if such an eye does quiet down, and no operative interference through the vitreous cavity has been attempted, it has yet to be proved that there is any added danger of sympathetic ophthalmia. Ruptures of the globe with prolapse of the ciliary body are most difficult to deal with, and most of them come to excision.

As to how long it is justifiable to persist in our efforts to save a badly injured eye? Roughly speaking, after six weeks or two months, if an eye is not quiet, the danger of sympathetic inflammation becomes paramount in one's mind. If there is no perception of light there is no doubt that the eye ought to be excised; but if there is still a possibility of useful sight, and especially if the sight of the other eye is defective, the question is extremely difficult, and indeed no general rule can be laid down. The indications for excision are: continued injection of the injured eye; sympathetic irritation in the other eye; a greenish semitranslucent appearance of the iris; hazy, indistinct

whitish reflex from the fundus; continued fluffy appearance of the lens capsule; and a tendency to lowered tension. If, in addition to any of these, there is 'keratitis punctata' in the injured eye, there is good reason for believing that the pathological processes which give rise to sympathetic ophthalmia have already been established, and although we certainly ought to excise such an eye, we can have no certainty that we shall have been in time to obviate the danger to its fellow.

In cases where the presence of keratitis punctata in the sympathizing eye shows the process to have already been established, it may be too late to do much good by excising the injured eye; and when the vision of this is useful it should be retained, as it may eventually turn out to be the more useful eye of the two. When this is not the case, it should of course be excised at once.

With regard to the *pathology of sympathetic ophthalmitis*, the importance of the work of Fuchs (*see* MEDICAL ANNUAL, 1907, 342) is acknowledged by most authorities, and confirmed by the observations of Greeves,[2] who looked up the records of all the cases at Moorfields during the past fifteen years, in which the changes—chiefly choroidal—described by Fuchs were found in the excised eyes. In each case evidences of sympathetic inflammation developed in the uninjured eye either before or within a week of the enucleation of the injured one. The interval between the injury and the appearance of inflammation in the injured eye was never less than two weeks, and in the majority of cases not more than three months. It appears to be proved, therefore, that the disease in question is in its causation essentially distinct from other forms of uveitis. The work of Browning (cf. MEDICAL ANNUAL, 1913, 235) carries us still further.[3] He finds that the blood of patients suffering from sympathetic ophthalmitis has certain characters quite different from the normal, and strongly resembling that of subjects of certain other diseases, all of which are protozoal in origin. The blood-count in sympathetic ophthalmia, in common with syphilis, malaria, and other less common protozoal diseases, shows a very marked increase in the percentage of large mononuclear cells. The inference is that sympathetic ophthalmia is also a disease caused by a protozoon. If so, it may be amenable to the same class of drugs that have been so successful in the treatment of syphilis. Acting on this idea, the surgeons at Moorfields have now treated a large number of cases of sympathetic with either **Salvarsan** or **Neosalvarsan,** and their example is being largely followed throughout the country. The results have been on the whole encouraging, and in some cases completely successful. It needs a skilled pathologist to undertake the blood-count, but if such a one is available it is a measure which ought always to be adopted in cases of serious injury where there is a possibility of sympathetic ophthalmia. A normal count does not exclude the possibility of sympathetic ophthalmitis supervening, but an increase in the large mononuclear cells with some lymphocytosis is very ominous, and may form an invaluable indication for the excision of an injured eye. A blood-count is also of use

in prognosis, in cases where a slight attack of sympathetic ophthalmitis has been present, and where subsequently the question of operation, for instance for cataract, has to be decided. It must be remembered, in drawing conclusions from the blood-count, that syphilis is also a protozoal disease, giving a count very similar to sympathetic ophthalmia ; so that before diagnosing the latter it is always necessary to exclude the former by means of a Wassermann reaction.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 1153 ; [2]*Ibid.* 1154 ; [3]*Ibid.* 1155.

EYE MUSCLES, AFFECTIONS OF. *A. Hugh Thompson, M.D.*

Heterophoria.—At the last Oxford Ophthalmological Congress, Reber,[1] of Philadelphia, read an interesting paper on the present status of the heterophoria question. By this term is implied a want of balance between the muscles of the two eyes which, without producing actual squint, gives rise to more or less extra nervous effort in order to maintain the two eyes parallel. By the older generation of ophthalmic surgeons little attention was paid to these defects, and it is perfectly true that except in those cases where distressing symptoms can be traced to them they can be safely left untreated. On the other hand, where such symptoms are present, appropriate treatment may give great relief. Such treatment may be either (1) By exercises with prisms or by lateral rotation of the eyes, the prisms to be placed in such a position as to give more work to the defective muscles ; (2) By the constant wearing of prisms placed in such a position as to give less work to the defective muscles ; or (3) By operation. Gross want of balance in the horizontal direction is far more common than in the vertical. On the other hand, the proportion of vertical cases requiring treatment is far greater than that of the horizontal. Exophoria by itself seldom causes symptoms, but if it goes along with weakness of convergence, exercises are often useful. Occasionally, weak prisms, base in, incorporated with the reading glasses, are indicated. When exophoria is secondary to myopia, the full correction of the myopic error often gives relief, because it brings into play the convergence effort normally associated with accommodation. Operation is rarely indicated, except where there is actual divergence. Esophoria, similarly, since it usually goes along with hypermetropia, is often amenable to refractive treatment—the wearing of the proper hypermetropic correction without prisms. Other cases may be benefited by 'lateral rotation' exercises—the moving of the eyes alternately to one side and the other while the head remains still. In cases where symptoms persist, the constant wearing of weak prisms base out, often gives relief. The strength of the prism should be only 1° in each eye at first, to be increased gradually as may be necessary. In the case of hyperphoria with symptoms, exercises are practically no good, but the permanent wearing of prisms which partially overcome the weakness is most successful. Out of 376 cases in which Reber prescribed vertical prisms for constant use, the results were brilliant in 102 cases, and great improvement resulted in 195. " We cannot

put down the feeling that a practice which has produced a favourable outcome in 297 of 376 cases has justified itself."

Nystagmus.—There was an interesting discussion on this subject at the Royal Society of Medicine last spring. As far as the etiology of miners' nystagmus goes, the views summarized in the MEDICAL ANNUAL for 1913 (p. 350) were reiterated. The main cause of miners' nystagmus is defective illumination. An insufficiently understood fact, however, is that the physical sign may persist for a long period without causing any symptoms. Two miners, says Llewellyn,[2] may show to an equal extent the objective signs of the disease ; one only may complain of objective symptoms and be incapacitated. Any accident to the eye, head, or body may convert a latent attack of nystagmus into a manifest one in which the subjective symptoms are marked. Suggestion may have the same effect, as when the unconscious subject of nystagmus is medically examined and told of his defect.

Miners' nystagmus is generally rotatory. The following method of examination in doubtful cases is recommended by Pooley :[3] Make the patient shovel imaginary coal for a few minutes in a well-lighted room, and examine him immediately with the ophthalmoscope by the indirect method. Circular rotation of the discs shows nystagmus. If the result is negative, repeat the experiment in a darkened room, and make the ophthalmoscopic examination with the minimum amount of necessary light.

REFERENCES.—[1]*Ophthalmoscope*, 1914, Oct. and Nov. ; [2]*Proc. Roy. Soc. Med.* (*Sect. Neurol., Ophth. and Otol.*), vii, 47 ; [3]*Ibid.* 84.

EYELIDS, DISEASES OF THE. *A. Hugh Thompson, M.D.*

New growths on the eyelids are now often successfully dealt with by means of **X Rays, Carbon-dioxide Snow,** or **Radium.** There will always be cases, however, especially of epithelioma, which require the knife, and the great difficulty in these is to supply a flap which shall

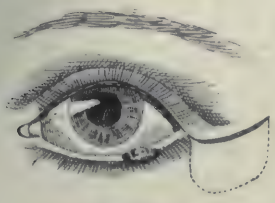


Fig. 24.

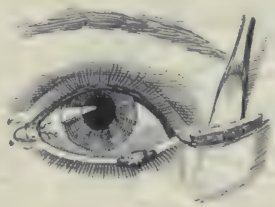


Fig. 25.

avoid a disfiguring ectropion on the one hand and a symblepharon on the other. The accompanying figures illustrate the method of Gibson,[1] of New York, who employs a pre-grafted flap. This involves two operations. The first consists in the formation of a pouch under the skin immediately adjacent to the outer canthus, and the insertion of a skin flap of a size accurately corresponding to the piece of lid to be

removed in this pouch, so that the surface which was originally external now looks inwards (*Figs.* 24 and 25). About ten days later, when the flap has become completely adherent, the epithelioma is excised, the flap freed from surrounding skin on three sides (*Fig.* 26),

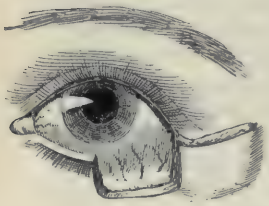


Fig. 26.

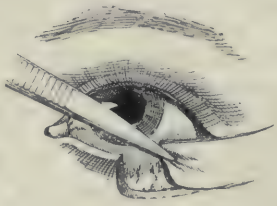


Fig. 27.

Fig. 28.

drawn forward to fill the gap in the lid (*Fig.* 27), and then sutured (*Fig.* 28). The result in the author's case has been excellent. For a more detailed account of his procedure the original paper must be

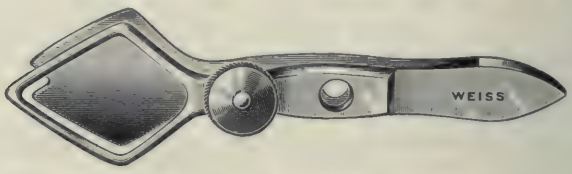


Fig. 29.—Harman's tarsorrhaphy forceps.

consulted. The point of the operation is that the new surface, which was originally skin, assumes the character of a mucous membrane, and does not become adherent to the ocular conjunctiva.

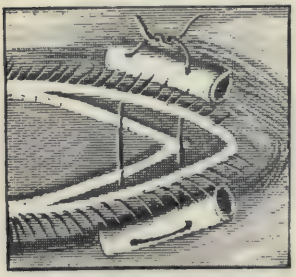


Fig. 30.—Suture employed in narrowing the palpebral aperture (Harman).

Harman[2] finds that the disappointing effect of a glass eye is often due to an unusually large palpebral fissure, which in the natural condition is often a beauty, but with a glass eye renders the deformity only too obvious. In such a case he has obtained an excellent result by artificially narrowing the palpebral aperture. To control bleeding, it is well to employ a specially devised clamp to be inserted under the external canthus. (*Fig.* 29.) The intermarginal space is then incised with a bent keratome to the depth of 5 or 6 mm. To secure adhesion of the two opposite raw surfaces a suture is inserted, as in *Fig.* 30, and tied over rubber tubing.

References.—[1]*Ann. Surg.* 1914, i, 958; [2]*Lancet*, 1914, i, 382.

FÆCES, EXAMINATION OF. *O. C. Gruner, M.D.*

A notable account of the fæces from the point of view of clinical pathology has been published by Cammidge.[1] This work should be utilized extensively. A number of contributions which are presented in a usefully precise fashion are also to be found in the work edited by French.[2] A third summary of the subject has appeared (unsigned) in *Evans' Journal*.[3] The main importance of microscopic examination is emphasized in these places, although researches into the chemical composition continue to be prosecuted by various observers.

Brown[4] has investigated the *diastase content* of the fæces with a view to ascertaining if evidence of pancreatic efficiency could be obtained thereby. He concludes that rigorous precautions about diet, purgation, and methods of estimation of diastase, will yield fairly constant results for healthy persons, while in cancer of the head of the pancreas the amount is very low. There is very little diastase in the fæces in cases of chronic pancreatitis. In gastric achylia there is no deviation from the normal.

Occult Blood.—Goiffon[5] recommends the use of a solution of potash (20 per cent) containing phenolphthalein and zinc powder. The latter causes the solution to be colourless. The fæcal matter is tested with the reagent in the presence of a drop of hydrogen peroxide. An immediate red colour speaks for blood. Cammidge[1] uses the benzidin test as a matter of routine, with the aloin or guaiac test to confirm it. "If it is found that a series of four or five examinations on consecutive days all give a positive result, it is very probable that there is a malignant growth in the stomach, intestine, pancreas, or bile-ducts, while the intermittent presence of occult blood is in favour of the ulcer being a simple one."

Microscopic Examination.—A few of the specially interesting findings are illustrated in *Plate XXII.* The subject is fully dealt with in Cammidge's work.

A number of papers on *the bacterial flora of the intestinal tract* indicate the increasing attention paid to this important subject. Publications by Andrewes[6] and Penfold[7] bring forward laboratory evidence of a degree of natural mutation of bacterial characters which must be considered as possible, even though opposed to previous teaching. Coplans[8] has found means of destroying the virulence of organisms, and unpublished studies at Montreal have shown the likelihood of the intestinal flora altering their characters from time to time during the individual's life. The ambiguity of the cultural reactions and the non-recognition of the influence of anaerobic environment have led to error and to an absolutely undue amount of blame being laid upon the colon bacillus. This has an important bearing on the employment of vaccine therapy. Metchnikoff[9] shows that in the case of infantile diarrhœa, it is *B. proteus* and not *B. coli* that is important (93 per cent). The *B. Welchii* and *sarcinæ* may be necessary associates. Bertrand comes[10] to the same conclusion. *B. proteus* is always present in infantile diarrhœa (London epidemic of 1912), and only

twice in the stools of twenty-four normal infants. In acid stools the *enterococcus* is the chief secondary organism, in neutral stools organisms of the dysentery group are present, and in alkaline stools *B. pyocyaneus*. *B. lactis aerogenes* was found to be symbiotic. Berthelot[11] confirms the importance of *B. proteus*. Gildermeister and Baerthlein[12] found it in 9 per cent of healthy, and in 31 per cent of sick, infants. Basten[13] finds *B. bifidus* very common in normal breast- or bottle-fed infants. He considers *B. acidophilus* a common normal inhabitant. Fuerth[14] describes a disease simulating typhoid fever, produced by an organism of the *B. fæcalis alkaligenes* group. Sandro[15] studied the distribution of amylolytic bacteria. The maximum numbers occur in the transverse colon ; they are absent in the duodenum, but may reappear in the stomach.

EXPLANATION OF PLATE XXII.

Each field represents the dominant features of the stool in the given type of case.

Fig. A.—Normal stool, showing the paucity of formed relics. The small yellow plaques are muscle remains. A fragment of vegetable fibre crosses the field. The background consists of detritus.

Fig. B.—Stool from an infant, showing imperfect starch digestion. The field is almost entirely composed of starch-grains.

Fig. C.—Stool of a case of intestinal dyspepsia. The clear crystals are triple phosphates. A few muscle fragments are seen. A sclerenchymal cell from a pear occupies the lowest part of the field. There is an abundance of detritus.

Fig. D.—Stool from a case of tuberculous enteritis. There is a wealth of partially digested food material, a portion of striped muscle fibre, other muscle fibres, needle-like fatty-acid crystals, a cluster of calcium carbonate crystals at about 5 o'clock, an epithelial cell in the centre, a piece of vegetable tissue at 1 o'clock.

Figs. E and *F* are from preparations stained by Pappenheim's panoptic method, to show a contrast between a case of simple intestinal dyspepsia (*Fig. D*) and of a bacterial enteritis (*Fig. F*) in an infant. Note the enormous numbers of organisms in the second case, and the entire absence of food-relics. On the left hand of *Fig. F* are a number of the blue bacillus of Escherich ; in the centre are some chains of *Streptococcus enteritis* ; and on the right, one or two clusters of *Staphylococcus enteritis*.

Figs. A—D are from unstained preparations.

Tubercle Bacilli.—Laird, Kite, and Stewart[16] use the antiformin method, and go over 400 fields. Sixty per cent of patients with tubercle bacilli in their sputum showed from 11 to 50 bacilli in 400 fields. Seventeen of the remaining 40 per cent showed no bacilli in their sputum at the time of examination of the fæces. (Klose found that 15 per cent of all tuberculous cases autopsied at Rotterdam showed intestinal lesions).

REFERENCES.—[1]*The Fæces of Children and Adults*, Wright & Sons, Bristol, 1914 ; [2]*Index of Differential Diagnosis*, ibid. 1913 ; [3]*Evans' Jour.* 1914, 319 ; [4]*Johns Hop. Hosp. Bull.* 1914, 200 ; [5]*Presse Méd.* 1913, 897 ; [6]*Lancet* 1913, ii, 239 ; [7]*Brit. Med. Jour.* 1914, ii, 710 ; [8]Personal Communication ; [9]*Ann. de l'Inst. Pasteur*, 1914, 89 ; [10]*Ibid.* 121 ; [11]*Ibid.* 132 ; [12]*Deut. med. Woch.* 1913, 982 ; [13]*Münch. med. Woch.* 1914, 1354 ; [14]*Ibid.* 1913, 2660 ; [15]*Pathologica*, 1913, 319 ; [16]*Jour. Med. Research*, 1913, 31.

FIBROSITIS.

(*Vol.* 1914, *p.* 238)—At the above reference Luff's therapeutic methods are described in detail. Among these may be noted his advocacy of **Potassium Iodide** in full doses, and a local application consisting of equal parts of **Chloral Hydrate**, **Camphor**, and **Menthol**. For chronic localized forms he advises local use of **Heat** followed by **Ionization**.

PLATE XXII.

EXAMINATION OF FÆCES

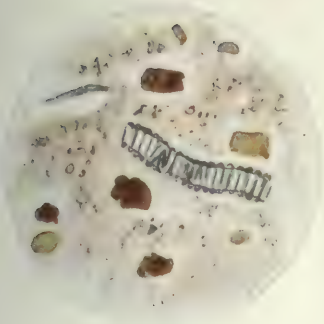


Fig. A.

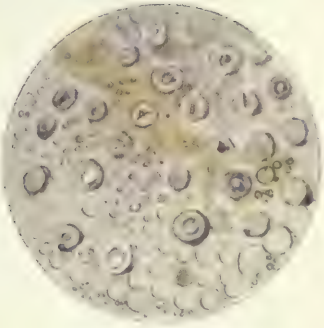


Fig. B.

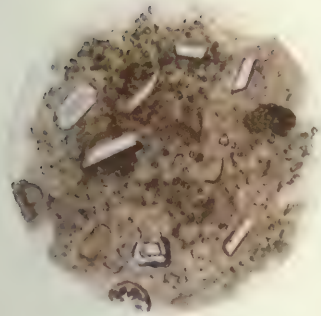


Fig. C.

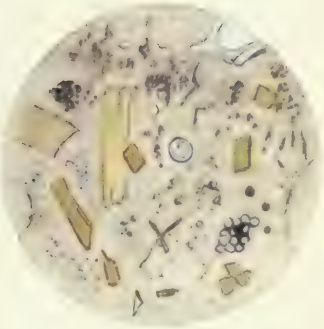


Fig. D.

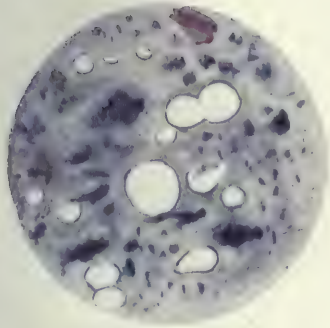


Fig. E.

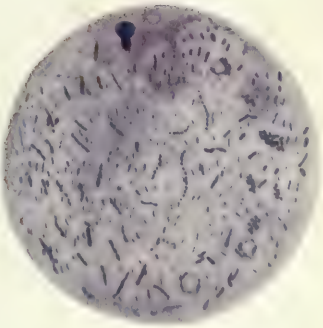


Fig. F.

O. C. Gruner

FILARIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

J. A. Cruickshank and R. E. Wright[1] publish an illustrated report on an investigation of filarial disease in Cochin in Southern India. They made clinical examinations, and examined the blood between 9 p.m. and midnight in 1000 persons, and found microfilaria in 20·9 per cent, and certain clinical evidence of filarial disease in 12 per cent more. Further, there was probable clinical evidence in 13·4 per cent and possible in 26 per cent, giving a total possible infection of 72·3, and probable infection in 46·3 per cent. Eosinophilia was met with as frequently in non-filarial cases, largely owing to the great prevalence of ankylostomiasis. Filarial fever was studied, and is considered to be always due to inflammation of some part of the lymphatic system. They obtained a history of fever in 29·4 per cent (while malarial fever is rare in Cochin), and they think it may sometimes be due to the death of adult filaria in the lymphatic trunks. Adult worms were searched for in 23 specimens, and found in 7, mostly in the calcified form. A few living worms were met with and are minutely described. Both they and the microfilaria correspond most closely with *Filaria bancrofti*. The adult worms induce a progressive fibrosis subsequently to inflammatory changes not necessarily associated with bacterial invasion. They obtained full development of the filaria in *Culex fatigans*, and irregular, but nearly complete development, in *N. rossii* and in *C. micro-annulatus*. The prophylaxis of the disease depends on mosquito reduction.

E. R. Braoch[2] has used **Salvarsan** in the treatment of filariasis, many of the patients also being subjects of syphilis. From his experience of nineteen cases so treated he concludes that there often result disappearance of filaria from the blood, discontinuance of febrile attacks, healing of indolent ulcers, and reduction in the size of the elephantoid limbs. In a few cases with only slight swelling it disappeared. In some cases the treatment fails.

References.—[1]*Ind. Jour. Med. Research*, 1914, 741; [2]*Jour. Trop. Med.* 1913, 364.

FOOT, SURGICAL AFFECTIONS OF. (*See also* Bones, *and* Paralytic Deformities.) *F. W. Goyder, F.R.C.S.*

Tarsalgia.—Merrill,[1] investigating this subject, found in many cases a marked similarity in the radiographic findings. Painful contracture of the posterior tibial muscle was associated with painful static subluxation of the mediotarsal joint, the head of the astragalus being unduly prominent, and only partially disappearing on dorsal flexion. A depression of tone and power of the anterior tibial muscle usually co-existed. The condition yields to prolonged rest or to palliative measures. Should these fail, the author suggests tenoplasty of the posterior tibial muscle or arthrodesis of the calcaneocuboid or astragaloscaphoid joints, or both, but so far he has not found operative interference necessary.

Under the name of *tango-foot*, Boehme[2] describes tenosynovitis of the dorsal flexors, particularly of the tibialis anticus, a condition which he has observed repeatedly in those devoted to modern dancing. Dances requiring great flexibility of the ankle, particularly extension, flexion, and adduction, give rise to it. Treatment lies in complete avoidance of the exciting cause, massage, and dry heat. Fixation in plaster is inadvisable, and walking should be limited, but need not be forbidden.

Isolated Disease of the Scaphoid Bone (*Koehler's Disease*).—Under this title Pfahler[3] describes cases of painful scaphoid occurring in male children from two to nine years of age. He regards it as an inflammatory sclerosis. The condition is not tuberculous, and there is not necessarily a history of injury. It may last as long as three years. In the case recorded, there appears to have been a scorbutic element. Treatment consists in rest followed by massage. (*See also* FRACTURES).

Hertzler and Gibson[4] have attempted to trace to a common origin "certain *tumours of the foot* which follow similar clinical courses, but which have been separated into different groups upon histological grounds." They are either ulcerous or fungoid lesions which occur usually upon the sole, sometimes upon the ankle, and rarely upon the dorsum. They grow slowly, tend persistently to recur if excised, and metastasize by the lymphatics, forming secondary tumours along the lymph vessels, as well as in the nodes of the groin. Later, they may be disseminated by way of the blood-vessels into the lungs, liver, skin, and other organs. They originate apparently from subepithelial cells resembling the embryonal cells common in moles. Some of the tumours are melanotic. Some, which have the same histological structure, contain no pigment. Chromatophoroma is the most accurate term describing them; they are also known as melanoma, melanosarcoma, and melanoblastotoma. They are not epitheliomatous, nor can they be fairly classified with sarcoma. The prognosis is very bad. Free local excision, together with the glands in the groin, should be tried in all cases where operation is feasible. If dissemination has occurred, even amputation is useless; when glands along the iliac vessels are involved, any operation is useless. The condition usually occurs in late life, and may last from two to six years. It may be mistaken for perforating ulcer of the foot.

REFERENCES.—[1]*Surg. Gyn. and Obst.* 1914, ii, 67; [2]*Med. Rec.* 1914, i, 755; [3]*Surg. Gyn. and Obst.* 1913, ii, 625; [4]*Ann. Surg.* 1914, ii, 88.

FOREIGN BODIES, LOCALIZATION OF. *F. W. Goyder, F.R.C.S.*

Brown[1] describes a simple clinical means of localizing foreign bodies within the tissues. The area of skin surrounding the approximate position of the foreign body is marked out into 1-inch squares by horizontal and vertical lines of silver-nitrate solution. In the case of a limb the lines should surround it, those on the front being solid, those on the back dotted. When the silver solution becomes black,

the lines are covered with white-lead paint; antero-posterior and lateral skiagrams are taken, and the foreign body marked out on the skin in relation to the lines. In the case of a limb, the point of intersection of the foreign body with a solid and a dotted line should be noted.

Thompson[2] removes needles directly under the fluorescent screen. He prepares the skin, wraps the part in a sterile towel, and places it on the table above an *x*-ray tube. A fluorescent screen is held above, the light turned off and the *x*-rays on. The needle is localized, and pressure made by the finger over each end. The extremity of the needle associated with the greater movement is the more superficial, and therefore the point of attack. The finger is kept over this point, the light turned on, and eucaine and adrenalin injected at this site. An incision is next made at the same spot, and the lips retracted. In the dark, with the rays on, and the screen held by an assistant, fine artery forceps are passed into the wound, until they are seen to grasp the needle, which is extracted. The wound is sewn up in the light. The operation lasts only a few minutes.

References.—[1]*Ann. Surg.* 1914, i, 65; [2]*Brit. Med. Jour.* 1913, ii, 1227.

FRACTURES. *F. W. Goyder, F.R.C.S.*

Operative Treatment.—So much recent work has been done on this subject, and the reasons why particular methods have achieved such good results in the hands of certain surgeons and such bad ones in the hands of others, appear to be so little understood, that there need be no apology for dealing somewhat fully with the matter. A partial revulsion appears to have taken place against operative procedures, due mainly to their indiscriminate use and to imperfect comprehension of their possibilities and the principles to be observed when employing them. There can be no doubt, too, that much of the accumulated store of knowledge so necessary for the successful treatment of fractures by conservative means has been set on one side as old-fashioned. The necessity for fixation of the fragments, always regarded as so important in conservative treatment, has been largely lost sight of since metal plates came into use, too much reliance being placed upon the powers of fixation of the internal splint employed. Magruder[1] goes so far as to state that conservative treatment yields results better and quicker than the radical methods in every case of approximate anatomical reduction. Operative interference, apart from the employment of a foreign body, has a tendency to delay union. Operation is indicated if there is wide displacement of the fragments, and where correct apposition is otherwise impossible; also in articular fractures where ankylosis threatens. He thinks that the ideal suture is approached by 60-day-chromicized catgut, and the most trustworthy is tinned annealed steel wire. Wiring is the best method of fixation. Van Duyn has given up the use of plates. He holds that open operation is most satisfactory where immediate reduction cannot be immediately accomplished and permanently

maintained. Except where a gap has to be bridged, sutures alone should be employed. Where foreign material has to be buried, autogenous bone-grafts are best. Estes[1] is on the whole in favour of conservative methods of treatment if personally carried out by the surgeon in charge. Operative treatment should be reserved for those fractures which cannot be properly reduced or retained after reduction. Plating is better than wiring. The general conclusion at the discussion following Magruder's paper was, that if proper attention be paid to the individual requirements of each patient and each fracture, open methods will not be very frequently required. Brickner[2] believes that plates can cause delayed union and non-union. In a muscular limb, plates, even if reinforced by plaster, cannot be depended on to maintain alignment in fractured femur. Autogenous bone-grafts show a gradual fusion with the main bone, and suffer neither rarefaction nor absorption.

Much light is thrown on the causes of failure after operations for fracture in a paper by Hey Groves[3] on the treatment of fractures produced experimentally in animals, chiefly cats. He concludes:—

1. That the most rapid and perfect union follows 'indirect fixation,' namely fixation which does not interfere directly with the area of fracture. (This method can be applied to human beings in Lambret's transfixion method—*vide infra.*)

2. For such perfect results to be obtained, the method must ensure (*a*) perfect anatomical restoration, (*b*) fixation for the period required for union, and (*c*) perfect freedom for all the soft parts and joints, so that the limb can be used directly pain has ceased.

3. In all complete fractures there exists a very strong force which tends to displace the fragments until the muscles are thrown out of action and a position of stability free from tension is acquired. This involves great deformity, consisting of shortening, overlapping, and angulation.

4. The operative treatment of fractures should aim at counteracting this displacing force completely. It should replace the fragments not only accurately, but with such mechanical efficiency that displacement cannot occur.

5. The mere presence of an aseptic indifferent foreign body in the tissues has no ill effect upon healing tissues, unless there is an interposition of its substance between structures which ought to unite.

6. The frictional grip between a bone and a screw will rapidly give way if subjected to much tension, owing to absorption of bone.

7. The union of bones by plates and short screws is mechanically inefficient, because the screws are quickly pulled out of the bones.

8. Sepsis is often the result and not the cause of inefficient mechanical fixation.

9. Mechanical efficiency in the direct operative treatment of fractures can be attained in two ways, (*a*) by the use of long plates and pins or bolts which transfix and hold the bone by some broad flange or nut, and (*b*) strong solid intramedullary pegs.

10. Perfect anatomical union and normal function usually result from either of the above methods. Sound and rapid repair is perfectly consistent with absolute rigidity.

11. Delay in union is a possible though exceptional result of perfect operative fixation of a fracture. It is probably due to interference with the blood-supply of the bone ends, and will cause no disadvantage if the mechanical fixation be so efficient as to hold the bones in position for an indefinite time.

12. The fixation of transverse or slightly oblique fractures by encircling wire is unsatisfactory, as it is mechanically inefficient, and allows from the outset a mobility which delays union by interfering with the zone of repair.

13. All forms of absorbable pegs are unsatisfactory, because they either bend or break before good union has occurred.

14. Metallic magnesium when used as a peg acts as a powerful stimulus to callus formation.

15. The natural position assumed by bones which are not fixed results in deformity, callus excess, or the formation of a false joint.

16. In the treatment of severely comminuted fractures, and in certain cases of open fractures, the best method is fixation of the main fragments, leaving the small pieces in position when strength of union is the main object, and removing them when callus excess is likely to interfere with the mobility of a joint.

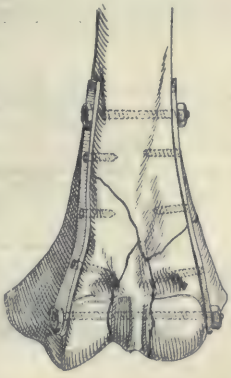


Fig. 31.—Fracture of lower end of humerus into joint treated by bolted-plate method.

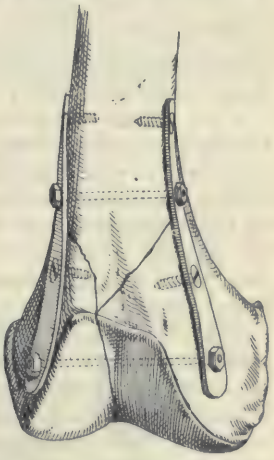


Fig. 32.—Bolted-plate method for fracture of the lower end of the femur.

In the light of these experiments, supplemented by operative work on human beings, Hey Groves[4] in his Hunterian Lecture examines the results of the Fracture Committee of the British Medical Association. He notes that in the group of cases giving the best results to non-operative methods (tibia and fibula), there has been the greatest activity in operating, whereas where there has been the greatest failure of the old methods the new surgery has done almost nothing. Hence operative methods should be directed largely towards those cases in which the results of conservative treatment are bad.

The ideals to be aimed at are: (1) Not to operate on any case which would probably give as good a result by conservative treatment;

(2) To employ a method which will ensure perfect anatomical restoration of form; (3) To secure such efficiency of mechanical fixation at the conclusion of the operation, that the bone is stronger than before the fracture; (4) To do this by a method of fixation which will last for an indefinite time and which does not depend upon the frictional grip of nails and screws upon the bone; (5) To restore the limb to a condition in which it can be freely moved as soon as the skin wound has healed, i.e., in one to two weeks, and used for its full natural function in a period of three weeks to three months according to the bone involved.

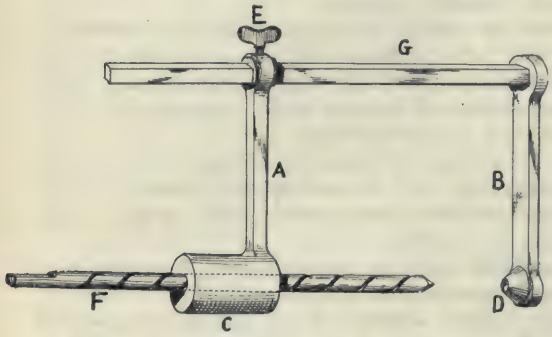


Fig. 33.—Drill guide for making a hole through corresponding points on the opposite sides of a bone. A, Metal bar movable on the bar G, where it can be fixed at any point by the screw E. B, Another bar, fixed to G, parallel to A. C, Metal cylinder $\frac{1}{2}$ inch long, perforated by a hole which just takes a twist drill. D, Conical face at the end of B, which fits into the countersunk hole of a plate. The action of the guide ensures the drill F perforating the bone at the point D.

Figs. 31–39 illustrate Groves's method of fixation, which produces excellent mechanical control of the fragments and, as he claims, gives rise to firm union and good functional results.

Chad Woodward[5] advocates Steinman's method of *extension* of the fragments, especially in comminuted and multiple fracture of any part of the femur, and when much shortening would otherwise occur from obliquity and splitting of the fragments. In the case of the femur, the skin being prepared with iodine and displaced upwards over the knee-joint, a steel pin 5 mm. in diameter has its blunt end fixed on a handle and its sharp end bored transversely

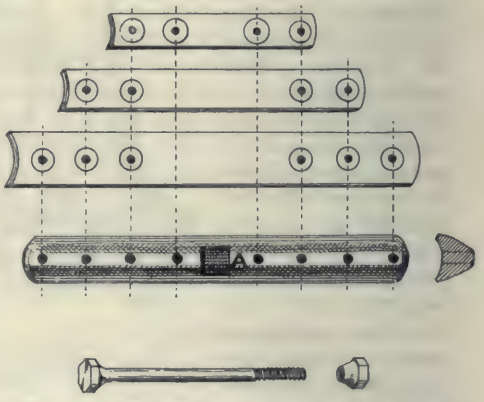


Fig. 34.—Three different-sized curved plates, 2 in., 3 in., and $4\frac{1}{2}$ in., and drill guide. The holes are so arranged in the plates as to exactly correspond, so that two plates can be used as an opposite pair, of the same or of different sizes. The drill guide contains holes corresponding to those of the whole series. The plates are of two shapes, flat and curved, and of 7 sizes, viz., $2\times\frac{5}{16}\times\frac{1}{32}$, $2\times\frac{1}{2}\times\frac{1}{12}$, $3\times\frac{5}{16}\times\frac{1}{16}$, $3\times\frac{1}{2}\times\frac{1}{16}$, $3\times\frac{1}{2}\times\frac{1}{8}$, $4\frac{1}{2}\times\frac{1}{2}\times\frac{1}{16}$, $4\frac{1}{2}\times\frac{1}{2}\times\frac{1}{8}$. The drill guide is shown in face and in section. A, Groove which fits one jaw of a clamp. In section the guide is $\frac{1}{2}$-inch thick, so that the drill held in its holes perforates the bone in exactly parallel paths. Below is seen a bolt and nut with hexagonal ends and countersunk faces.

through the lower end of the bone just above the condyles. To the projecting ends are attached cords in the required line of pull, and weights from 10 lb., increasing to 30 or even 40 or 50 lb., attached. The limb is steadied with sand-bags and laid on a pillow, with hip and knee slightly flexed. Splints are not essential. Massage and gentle movements may be begun in the first few days. It is easy to get lengthening of $\frac{1}{2}$ or $\frac{3}{4}$ in. in the first week or ten days, and this result should be aimed at. Five weeks is the outside limit necessary for extension, though three weeks is generally sufficient. The points of entry and exit of the pin should be protected by gauze soaked in collodion or Whitehead's varnish.

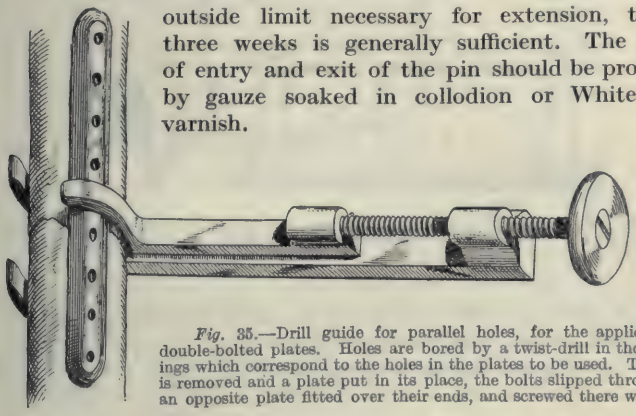


Fig. 35.—Drill guide for parallel holes, for the application of double-bolted plates. Holes are bored by a twist-drill in those openings which correspond to the holes in the plates to be used. The guide is removed and a plate put in its place, the bolts slipped through and an opposite plate fitted over their ends, and screwed there with nuts.

Lambret's method of indirect fixation is particularly applicable to fractures of the tibia and fibula. The main advantage of the method is that the patient has the fragments in accurate apposition, the joints are not fixed, and weight can be borne early. Hackenbruch[6] has improved Kaefer's extension clamp used with plaster-of-Paris by

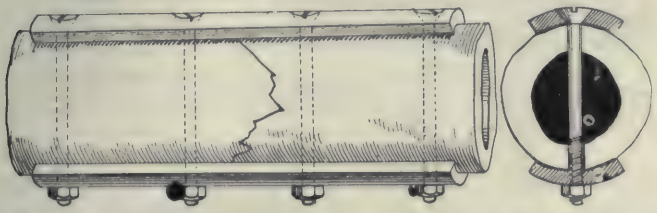


Fig. 36.—Bolted plates. Either curved or flat plates may be used according to the surface on which they have to lie. Also plates of different length may be used as a pair. The nuts do not project quite so much as they appear in the drawing—only $\frac{1}{10}$ inch.

applying one on each side of the limb. The bony prominences having been protected, the leg is encased in plaster, which is divided circularly about the middle of the leg, and the clamps fixed in the plaster, when extension causes the halves of the divided plaster to gape, and separates the fragments. As Kaefer's clamp allows extension in a longitudinal direction only, Hackenbruch connects the fastening

wings with the extension bars by means of ball-joints fixable by screws. Having by this means obtained the necessary extension, he corrects the alignment by loosening the ball-joints and refixing them in the corrected position. As a rule, four weeks' fixation is sufficient.

Quénu and Mathieu[7] are not in favour of extension by means of clamps buried in plaster, on account of the danger of injury to the skin and soft parts. They advocate long metal rods driven through

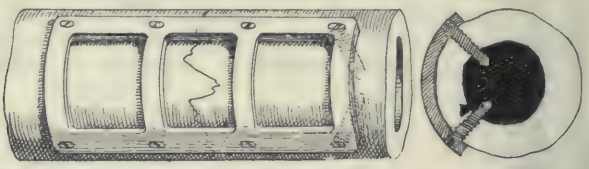


Fig. 37.—Quadrant plate, in position. The screws are 'metal threaded,' with a cutting drill point. They screw into the plate as well as the bone, so that when in place the plate and screws form a solid whole which cannot be displaced.

the tibia and os calcis, connected by expanded lateral rods. With the help of *x* rays they can correct and fix in the corrected position any deformity or displacement of the fragments. With reasonable care there is no danger of septic infection. The apparatus is in place for about three weeks. No movement or weight-bearing is allowed during this time, but massage may be employed from the first.

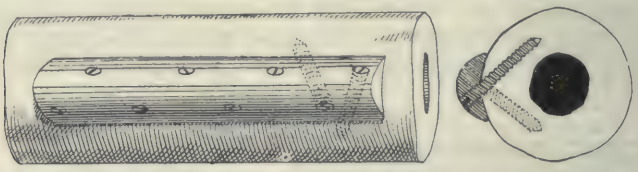


Fig. 38.—The triangular plate. The principle of this is the same as the quadrant plate, i.e., the metal-threaded screws screw into the plate as well as the bone, and are arranged in two series at an angle to one another. It requires a smaller exposure of the bone, but has not the same mechanical advantage as the quadrant plate.

Metal Bone Plates.—Edington[8] draws attention to the disadvantages of these plates. In spite of obtaining union, he had several cases of persistent sinus, often with caries around the nail-holes, and occasionally necrosis of the fragments. Loosening of the nails or screws he considers very frequent. These cases are few in proportion to the successful ones, but he believes it wisest in all cases to remove the plate at the end of the fourth week. Plating is not necessary in all fractures, nor does it dispense with the necessity for splints. In compound fractures, at least a week should be allowed to elapse before putting in a plate. Though less universally applicable, wires cause less trouble than plates. [It is possible that the lack of perfect fixa-

tion and the shortness of the screws, and possibly also of the plates, are responsible for the imperfect success of the methods employed.—F. W. G.]

As to the *type of plate* advisable in these operations, Lane's is too well known to need description here. Some of its disadvantages

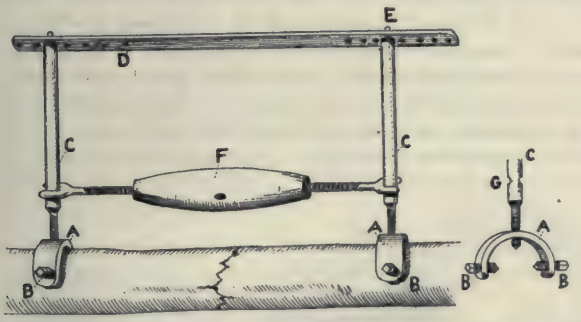


Fig. 39. — Clamps for separating and fixing fragments. A, Horseshoe bearing three screws B, B, and C, each of which has drill points. C forms a long handle by which the bone can be held or manipulated. When each fragment has been seized by a clamp, the bar (F) is adjusted so as to fit in the grooves (G) in the shaft of C, and then by the lever action of the handles and by the screw action of F the bones can be forcibly separated until the fragments are in apposition. The clamps allow the fragments to be freely moved in an axial, a lateral, or rotatory direction. When the fragments are in accurate apposition the bar D is slipped over the slide at the ends of C, C, and the bone is thus held whilst plates and screws are applied.

have been mentioned above. In spite of these it remains the most generally useful one yet devised. Perfect mechanical fixation can be got with it if a long enough plate is used. Hey Groves's appliances described above get rid of the difficulties caused by imperfect fixation, but a very free exposure of bone is essential for their application. Souttar[9] has devised a modification of Lane's plate for the fixation of fractures, especially if transverse, and more particularly of the femur and humerus. Mechanically it is adequate. It is made of thin sheet steel, and can be fixed either with screws or wires. The plate, made like a 'girder,' is 1 to 2 cm. wide and 5 to 10 cm. long. A narrow flange projects from one edge and lies on the surface of the bone, while the remainder is buried in a groove cut with a circular saw across the line of fracture in the long axis of the fractured ends. The flange is provided with holes for screws. Special screws

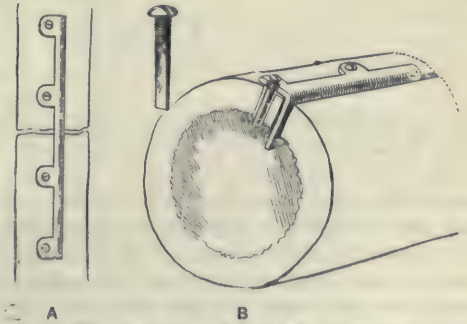


Fig. 40.—Souttar's Plate and Screws.
A, Face view of plate *in situ*; B, Diagrammatic section through a screw-hole.

with tapered ends are used. The method affords sufficient fixation to dispense with the necessity for splints and to allow of early massage (*Fig.* 40).

Bone Grafts.—Very great success appears to have followed the use of these methods of fracture fixation ; the best probably being some modification of the following. Albee[10] says that the problems involved in the union of recent and of ununited fracture are quite different. In the latter case osteogenetic power is at its lowest ebb ; hence an autogenous graft from some other bone of the body is essential, whereas in a recent fracture where the osteogenetic power of the fragments is normal or even increased, the graft may be taken from the bones themselves. Murphy's intramedullary dowel, though a great advance on former methods, is difficult to apply in small bones

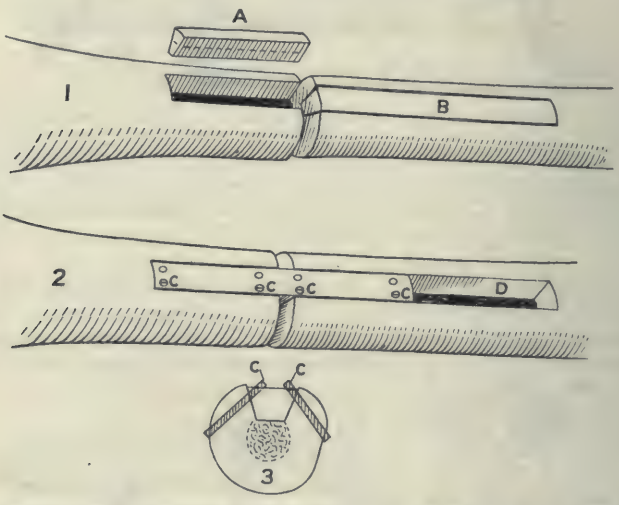


Fig. 41.—Albee's method for recent fracture, showing fixation of (B) by pegs (C) cut from (A). Alternately (A) may be placed to fill the gap (D), and grafts fixed as in ununited fracture.

where the medullary cavity is narrow. Albee in both cases exposes the seat of fracture, adjusts the fragments so as to get proper alignment, and fixes them in position by suitable clamps. In recent fractures he cuts with his twin saw two strips of bone of unequal length, one from each side of the fracture (*Fig.* 41). The longer one is placed so as to bridge the fracture, and fixed by bone pegs fashioned from the shorter. Or the shorter piece may be used to fill the remaining gap, i.e., the position of the two strips is reversed, and the bones fixed as for ununited fracture. In this case he reflects the periosteum over the strip of bone to be removed, and takes out pieces of equal length. A strip of the required length and breadth is then taken from the tibia to fill the gap. The graft is fixed in position by

kangaroo-tendon sutures passed through holes drilled close to the fracture (*Fig.* 42). Finally, the periosteum is sewn over the graft. Ununited fracture of the neck of the femur is fixed by a peg fashioned from a similar tibial graft.

Henderson[11] makes use of a method apparently identical with that employed by Albee. He does not find that in ununited fracture there is any loss of osteogenetic power in the fractured bone, since he obtained union in a tibia ununited for fourteen years, although the graft was taken from the same bone. Medullary plugs he regards as inferior to cortical grafts. Using a graft from the same leg saves the patient from a month's inaction. His patients are allowed to walk a few days after operation. The graft is taken from the flat internal surface of the tibia. A chisel may be used instead of the circular saw. Fixation of the graft is maintained by stitching its periosteum to that of the transplant. No pegs are used. Union is firm in from three to six months, and the limb, including knee and ankle, is kept in plaster about ten weeks. Eight cases, all successful, are reported.

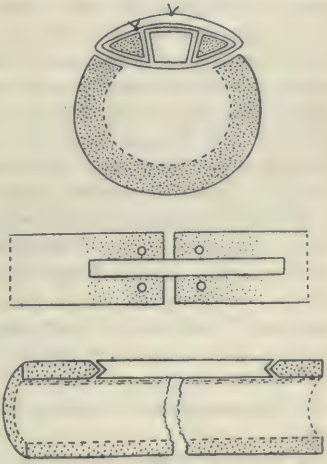


Fig. 42.—Albee's method of applying a bone-graft for ununited fracture, showing how the kangaroo suture is applied.

Intramedullary grafts have the disadvantage that in most cases either a groove has to be cut, to place the second half of the peg in position, or very wide separation of the fragments has to be obtained. Even in this case the graft has to be narrower than the cavity into which it is put. A certain amount of bending of the graft must also be possible ; this naturally means that the plug is weaker than is desirable. Robinson[12] reports successes by this method. He does not find it necessary to use periosteum-covered grafts. In most cases he was able to fix the graft into both ends of the fracture by extension ; in one he had to cut a groove in the lower fragment. Where the tibia has to be repaired, the fibula is left ununited. He does not find a circular saw essential for rapid work. He outlines the graft with a wood-carver's small triangular chisel. Separation is effected with a larger chisel applied from beneath the crest of the tibia upwards. The bone breaks away in the grooved lines without splitting or splintering. Davison[13] by the same method is able to report good results in recent fractures of the tibia, femoral shaft, femoral neck, and the shaft and neck of the humerus. By making the diameter of the bone cavity in one of the fragments greater than that of the graft, he gets over much of the difficulty of fixing the fragments in position.

SPECIAL FRACTURES.

Radius and Ulna.—The smallness of the medullary cavity in these bones makes the application of an autogenous medullary graft difficult. In addition, it is difficult to introduce the graft. Hence Schone[14] employs a silver flexible but strong wire 2·8 to 4 mm. in thickness, which he introduces through a trephine opening at some distance from the fracture. By means of a special holder, he pushes the wire along the medullary cavity across the line of fracture, and into the medulla of the other fragment, for a sufficient distance. In recent fractures exposure of their seat is not always necessary, but in ununited cases this must be done to re-open the closed medullary cavity at the break and to correct the alignment. A wire of sufficient length is chosen, the last inch or so being pushed by means of a special instrument so that it lies in the depths of the trephine wound and does not project from it. The best spots for the trephine opening, which may equally well be made with a burr or grooved chisel, and should have a shelving edge for the introduction of the bolt, are, for the ulna, on the dorsal aspect proximal or distal to the fracture according to its site ; the radius is most easily approached distally ; but it is possible proximally, by separating muscle fibres and avoiding the posterior interosseus nerve on the dorsal aspect.

The Hip.—As regards fractures in this region, many surgeons have obtained good results from the use of bone pegs driven in at the base of the trochanters into the femoral neck. In this connection Ashhurst[15] advises a return to Astley Cooper's classification of fractures of the upper end of the femur, which Ashhurst elaborates as follows :—

1. Intracapsular fracture of neck, not impacted—Cooper's original term.

2. Extracapsular, involving trochanter (*a*) at junction of neck and trochanter, impacted, i.e., incomplete fracture of trochanter—the uncomplicated form of Cooper, (*b*) At the same level, more complete, partial comminution of great trochanter, (*c*) complete ' typical' fracture through trochanter, both trochanters injured, usually with some comminution.

3. Subtrochanteric fracture.

The treatment of Class (1) consists in extension for about seven weeks ; of (2*a*), extension with a small weight for six weeks ; in (2*b*) and (2*c*) the treatment varies according to circumstances. Extension should be applied with some apparatus such as Volkmann's sliding splint, to prevent rotation. In some cases lateral traction may be applied in addition. Fixation in abduction is occasionally useful. For Class (3) operative measures are best if the patient's condition warrants it.

The Patella.—Dreyer[16] communicates an important observation, of great interest in diagnosis. The patient with fractured patella is unable to extend his leg actively, or to keep it extended when seated. If extension be applied to the thigh alone above the knee, thus

bringing the fragments into apposition, if the lateral expansions of the quadriceps tendon are intact, the patient is able to extend the leg, a feat impossible without the extension. This sign is naturally present most frequently in fracture by direct violence. Extension applied in this way is useful after operation, especially during recovery from anæsthesia, since it prevents jerks and gives better relaxation to the sutures than plaster or splint. Good results can also be obtained by this method of extension even when no operation is performed.

Deltour[17] reports ninety-nine arthrotomies for fractured patella, all with good results. He has given up the use of wire, preferring chromicized catgut. In either single or multiple fractures the results seem equally good. A curved incision with the convexity upwards, is used. Great importance is attached to the removal of tendinous structures from the fracture area, to accurate apposition and suture of the lateral expansions, to careful suture of the tendinous structures over the line of fracture, and to the use of a mattress suture across the patella, passed through the patellar ligament below and the tendon immediately above, the patella. The after-treatment is important. The limb is put in plaster from the toes to the upper thigh, immediately after the operation. In ten days it is cut down the sides and the anterior half removed. The posterior half is used as a permanent splint. The sutures are removed, and lateral movements of the patella begun and repeated every few days till the end of the third week, the patient in his splint being allowed the use of a wheel-chair. Passive movement is then begun, and the splint is left off at night. If 45° of movement cannot be got at the end of two months, forcible movement limited to 90° is done under an anæsthetic. The posterior splint is used for walking for at least three months ; after the second month the splint is removed, when the patient sits in a chair, allowing the leg to bend as much as possible. *X*-ray photographs appear to show bony union.

Quénu and Gatellier[18] review the results of operative treatment for fracture of the patella of long standing. They advise V-shaped section of the quadriceps to obtain approximation of the fragments. If coaptation cannot be obtained, the best and simplest method is that of Ferraresi, who dissects out the tendon of the quadriceps, making a flap 2 mm. thick, rather longer than the normal patella, and hinged at the upper border of that bone. It is then brought in front of the fragments and stitched to the upper end of the patellar ligament, below the lower fragment. The free edges are not freshened in the original operation, but the authors advise this, with incision of the lateral expansion and deep transverse division of the fibrous tissue 2 cm. above and below the fracture. Autogenous bone-grafting has been performed in this condition with the idea of preventing re-fracture. The fracture is exposed, and the lateral rents in the fibrous capsule are accurately sutured. The anterior surface of the patellar fragments are denuded of periosteum over an area about 1 in. square on each side of the line of fracture. From the inner

surface of the tibia a quadrilateral plate $1\frac{1}{2}$ in. by $\frac{3}{4}$ in. and $\frac{1}{8}$ in. thick is chiselled off, leaving its periosteum undetached. This is placed with its raw surface in apposition with the denuded area in front of the patella. The fragments are united by a figure-of-eight suture of chromicized catgut or kangaroo tendon, which grasps the ligamentum patellæ and quadriceps tendon immediately below and above the broken bone, and crosses in front of the transplant. The periosteum which was previously turned back from the patella, is next drawn up to, or over, the transplant with a couple of catgut sutures. Rogers[19] reports two successful cases.

Fractures into a Joint.—Bland-Sutton[20] notes that in such cases, when callus is thrown out, movements are impaired. Detachments of a small articular piece may produce displacement of the fragment and its union at an abnormal angle, while chronic inflammation of a joint, which often follows fracture involving articular surfaces, may end in fibrous bands within the joint and occasionally in complete disorganization. These disadvantages are got rid of by removal of the fragment. Bland-Sutton reports three cases in which he has removed the articular surface of the malleolus at the *ankle* for fracture of the external malleolus, with excellent functional results and no impairment of stability.

Horwitz[21] points out that uncomplicated fracture of the *tarsal scaphoid* is not uncommon. The cases are usually diagnosed as sprain. There is commonly partial disability only, and tenderness is not intense. Crepitus is unusual. Discomfort is greatest when walking, and traumatic flat-foot results. No great violence is necessary to produce the fracture. The original injury may escape notice, and advice is sought for weak ankle. Abduction is pronounced ; forced abduction painful. The scaphoid is displaced down, and is thickened and tender, unlike ordinary flat-foot. Unlike this condition, too, there is no tenderness at the tubercle of the os calcis, but pain following the course of the separated tibialis posticus is frequent. There is no disability of the tarsal joints, unlike rigid flat-foot. A rigid flat-foot support aggravates the pain. If seen early, treatment consists in immobilization for fourteen days, followed by massage and felt padding under the arch. Later, a cork pad is put in the shoe. In late cases, strapping and felt pads are applied until all pain is gone, when a cork pad is put in the shoe. In this connection it is interesting to compare the symptoms associated by Mouchet[22] with the presence of an *os tibiale externum*, a not uncommon supernumerary bone of the tarsus (*Fig.* 43). (This bone is the tubercle of the scaphoid, which has a separate centre of ossification and may develop

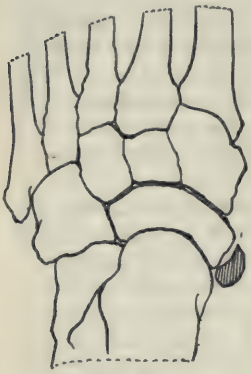


Fig. 43.
The os tibiale externum.

as a separate bone). When present, it is usually on both sides, and gives rise to symptoms which may be confused with fracture in that region. Not infrequently there are no symptoms. Flat-foot is usually absent, but pseudo-tarsalgia may occur. In other cases flat-foot occurs, and pain may be partly due to that. The condition may be discovered on examining for injury, when unilateral pain with bilateral os tibiale externum will exclude fracture of the scaphoid tubercle. In traumatic cases, no treatment of the bone is necessary. In the absence of trauma, treatment should be directed to the flat-foot if present ; if it fails, excision of the bone should be performed, followed if necessary by cuneiform tarsectomy on the inner side. In the absence of flat-foot the bone may be excised, but rest and exercises may suffice. It is possible that in traumatic cases separation of the epiphysis may simulate the presence of an os tibiale externum.

Open Fracture of the Long Bones.—Pringle[23] records 230 cases treated by operation ; 66 of these were so seriously injured as to require immediate amputation, and 19 had secondary amputations. Two methods were employed in the treatment of the remainder. In one series simple ' cleaning ' was practised ; in the other, the fractures were fixed by wires, plates, or screws, in addition to cleaning. Cleaning consists in excising the original wound and exposing the deep wound. Particles of dirt are picked or cleaned off ; if the ends of the bone are ingrained with dirt, they are chiselled off ; but the soft parts are handled as little as possible. Where fixation is employed, the methods of cleaning are more extended. Of 112 cases treated by fixation, 97 whose limbs were saved recovered with good union of the fractured bones. Secondary amputation on account of sepsis was required in 2·6 per cent of these cases, whereas in those cleaned without fixation it was required in 10·8 per cent. The author believes that more perfect asepsis is obtained from the free opening necessary for fixation ; hence he advises it in preference to simple cleaning and replacement of the fragments.

Jackson Clarke[24] says that the aim of operation in simple fracture is to secure the fragments together much as the pieces of a broken pot are restored when they are fixed together by rivets. He does not find that plating and other forms of internal splinting hinder good repair. Walters,[25] from an experience of four cases, has had variable results from autoplastic medullary bone-grafts. Two of the cases were successful, but union was delayed in both.

Fractures at the Ankle.—Writing on the importance of careful treatment, Speed[26] says that among a labouring class nothing so interferes with wage earning as weakened leg-support ; the whole train of life that follows the ability to get about on two good feet is very different from that which follows the permanent and partial disability of a bad ankle. These fractures have some permanence even when treated by the very best methods, and each man so afflicted should be given the best attention to shorten his disability, and should not be allowed to use the ankle until callus is hard enough, and liga-

ments are firmly enough healed to bear his weight, without causing a further interference with his wage-earning capacity within a few weeks after he has returned to his occupation. The ankle fractures may mean, in every case except those of the slightest crack, a disability of three months, and in severe cases nine to fifteen months is not unusual. The classical Pott's fracture is rare. Each ankle fracture should be treated on its own merits and not by routine. Lateral skiagrams should be taken to reveal lipping fractures and to show the position of the astragalus. More emphasis should be laid on the treatment of fracture of the external malleolus, with or without ligamentous damage on the inner side of the ankle, by over-correction in extreme inversion on a splint or in plaster. Special attention should be paid to cases with posterior or anterior displacement of the

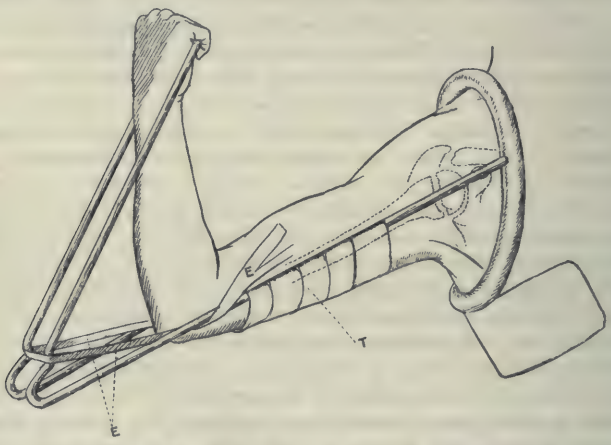


Fig. 44.—ALWYN SMITH'S METHOD FOR SEPARATION OF THE UPPER HUMERAL EPIPHYSIS. Bandages are omitted for clearness. The Extension (E) is fixed at the bend as shown, and the humerus lies in a trough (T), the hand grasping the end of the splint.

foot, as these indicate lipping fractures of the tibia or complete separation of the external malleolus, with loss of support of either anterior or posterior tibiofibular ligaments. In difficult cases, operative measures give the best results. Use of the foot should not be permitted until pain is not caused.

Separation of the Upper Humeral Epiphysis.—The results of treatment are not always as satisfactory as could be desired. Alwyn Smith[27] has found extension from the elbow, with the arm at right angles to the body, simple and effective. He uses a Thomas's knee splint bent to a right angle at a distance from the ring greater than the length of the humerus (*Fig.* 44). The lateral irons are placed on a slightly higher level than the humerus, and the trough is raised so as to elevate the lower fragment and bring it into line with the upper. The forearm and hand are lightly bandaged to the splint.

New Appliances.—Eliason[28] has devised an apparatus for applying extension or traction in the open treatment of fractures of the long bones adaptable to all operating tables and capable of exerting a pull from 0 to 220 lb. (*Fig.* 45).

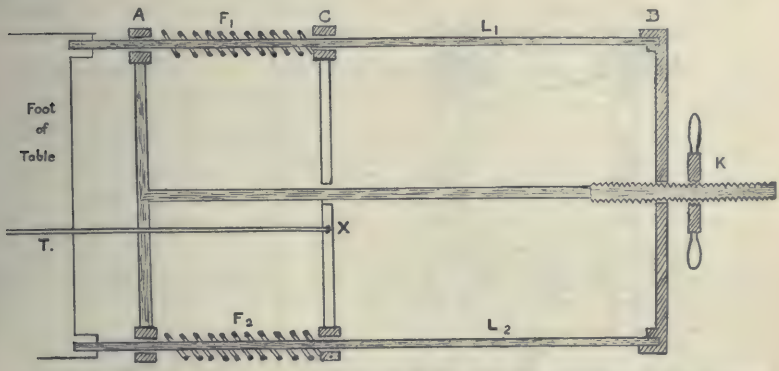


Fig. 45.—Diagram of Eliason's Traction Apparatus for the Reduction of Fractures during Operation.

The traction strap and cable T are attached to X at one end, and at the other to the part of the lower fragment which requires extension. Counter-extension is applied by perineal straps for the lower limb, or axillary straps for the upper, attached to the sides of the table. The cable is first fixed, and the slack taken up till it is taut. As the pilot wheel K is screwed up, the bars A and B are approximated. As B is fixed, the result is to carry A further from the table. This compresses the springs F_1 and F_2, shown in section. Hence the bar C is also carried away from the table, and extension, increasing as K is screwed up, is applied through the traction strap T to the limb. Note that the bars A and C can slide along the bars L_1, L_2, while the bar B is fixed to them. The illustration is purely diagrammatic, and merely illustrates the principle. The apparatus can be adjusted to fit any table whose foot is from 19 to 22 in. across.

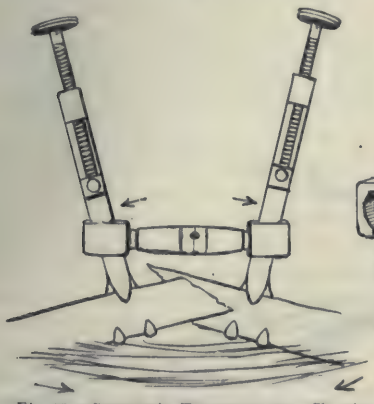


Fig. 46.—Gerster's Turnbuckles. Showing tendency for distal ends of Lowman clamps to diverge because of resistance of soft parts.

For fracture of the leg, Barth[29] uses Volkmann's foot-piece, which is provided with a T-piece to prevent its twisting. Into this he fixes two

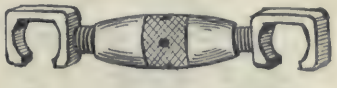


Fig. 47.—Turnbuckle armed with hooks.

lateral malleable iron bars padded and bent so as to fit the limb. These are fixed to the limb by bandages. In addition, if required, a dorsal bar may be added, also fixed to the foot-piece. For fracture or operation on the thigh or hip, the outer bar may be carried up to the axilla and the dorsal up to the thorax and bandaged to the buttock, thus fixing the pelvis. The method is said to afford excellent fixation.

Gerster[30] describes his method of obtaining correct alignment and preventing the angulation of the fragments, preliminary to plating a fracture. He uses two Lowman's clamps, one applied to each fragment. He first used a single turnbuckle uniting the two clamps

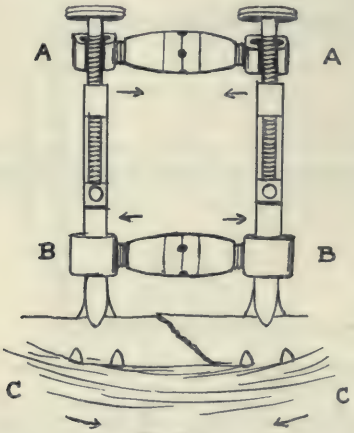


Fig. 48.

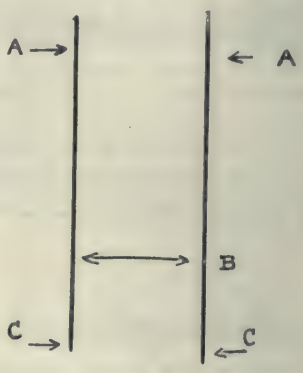


Fig. 49.

Fig. 48.—GERSTER'S TURNBUCKLES. Divergence controlled by hooked turnbuckle at AA. Arrows indicate lines of force. Usually it is more convenient to apply turnbuckle at BB, maximally contracted, and to apply hooked turnbuckle at AA, expanded sufficiently to engage divergent shafts. Then this same turnbuckle at AA is contracted until the clamps are parallel or nearly so; after this, expansion of turnbuckle at BB can begin.

Fig. 49.—The Lowman clamps constitute levers; the turnbuckle at B is the fulcrum; the resisting soft parts at C and the turnbuckle at A balance each other.

and placed close to the jaws. By this means he was able to separate the fragments, but he found that angulation could not easily be prevented. By applying a second turnbuckle close to the handles,

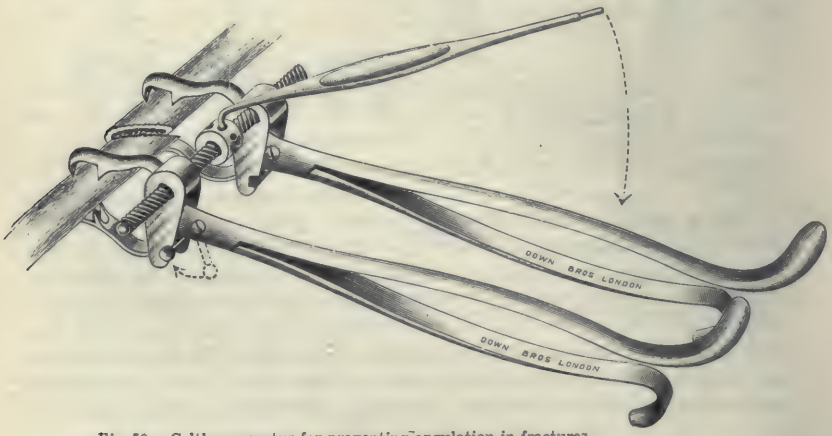


Fig. 50.—Colt's apparatus for preventing angulation in fractures.

he was able to keep the blades parallel, and the fragments in the same line (*Figs.* 46–49). Colt's apparatus (*Fig.* 50) for the same purpose[31] is simpler, and can be used with all ordinary bone-holding forceps of the Lane type. It preserves all the advantages of Lane's forceps, the length of the handles making the correction of angulation possible. Hey Groves's clamps, figured above, are also worthy of special study.

References.—[1]*Amer. Jour. Surg.* 1914, i, 1; [2]*Ibid.* 16; [3]*Brit. Jour. Surg.* 1914, Jan. 438; [4]*Lancet*, 1914, i, 435 and 513; [5]*Pract.* 1914, i, 360; [6]*Lancet*, 1914, i, 747; [7]*Presse Méd.* 1913, 981; [8]*Glasg. Med. Jour.* 1914, ii, 20; [9]*Ann. Surg.* 1913, ii, 653; [10]*Amer. Jour. Surg.* 1914, i, 21; [11]*Ann. Surg.* 1914, i, 486; [12]*Ibid.* 495; [13]*Jour. Amer. Med. Assoc.* 1914, i, 1551; [14]*Münch. med. Woch.* 1913, 2327; [15]*Ann. Surg.* 1913, ii, 494; [16]*Centr. f. Chir.* 1914, 931; [17]*Ann. Surg.* 1914, i, 975; [18]*Rev. de Chir.* 1913, ii, 173; [19]*Ann. Surg.* 1914, i, 483; [20]*Lancet*, 1914, i, 373; [21]*Ann. Surg.* 1913, ii, 526; [22]*Rev. de Chir.* 1913, ii, 825; [23]*Brit. Jour. Surg.* 1914, July, 102; [24]*Univ. Med. Rec.* 1914, July, 16; [25]*Bristol Med.-Chir. Jour.* 1914, 139; [26]*Surg. Gyn. and Obst.* 1914, ii, 73; [27]*Western Med. News*, 1914, ii, 153; [28]*Ther. Gaz.* 1913, 695; [29]*Centr. f. Chir.* 1914, 96; [30]*Ann. Surg.* 1913, ii, 656; [31]*Ibid.* 490.

FURUNCULOSIS.

(*Vol.* 1913, *p.* 250)—The use of Vaccines, whether stock or autogenous, should be supported by a surgical attack on individual boils as they arise.

FURUNCULOSIS OF EAR. (*See* Ear, Diseases of.)

GALL-BLADDER AND BILE-DUCTS, SURGERY OF.

E. Wyllys Andrews, M.D. (*Chicago*).

Maylard[1] thinks that cholecystostomy and more recently cholecystectomy have overshadowed cholecystotomy, which has its own sphere of usefulness. There are many cases in which the simpler operation answers equally well and is less dangerous. In 15 operations reported by him there were 7 colectomies, 5 cholecystostomies, and 3 cholecystotomies.

Fullerton[2] reports the results of 31 operations for diseases of the gall-bladder. He finds simple suture of the gall-bladder sufficient for traumatic rupture. Drainage of the gall-bladder after removing its contents was carried out in 15 cases. Total removal of the gall-bladder was done 11 times. Choledochotomy for opening the common duct was practised in 4 cases, and transduodenal choledochotomy in 1, for stone impacted in the ampulla of Vater. In 1 case the writer performed anastomosis between the common bile-duct and duodenum. In 5 of this series there was well-marked chronic pancreatitis associated with other gall-tract trouble.

Gibbon,[3] in discussing gall-bladder lesions, prefers to use the word infections rather than gall-stones, as expressing more properly the primary cause of the trouble. The writer reports 26 cases operated upon in the last six months. He considers the diagnosis of gall-bladder infection a sufficient indication for operation. In 3, all of which recovered, there was acute gangrenous cholecystitis. One had calcification of the gall-bladder, one stone in the ampulla of Vater, requiring duodenotomy. There were 5 deaths.

Whittemore,[4] reporting ten years' work in the Massachusetts General Hospital, collected 595 operations upon the bile-passages other than cancer, of which 154 were in men and 441 women. Cholecystostomy was done 88 times for cholecystitis, and 6 times for pancreatitis. The gall-bladder was totally removed 92 times for stone, and 39 times for cholecystitis. This operation seems to have been popular in 1902, 1903, and 1904, and less so in the years following. Choledochotomy was done 17 times, and duodenotomy 4 times. The mortality for cholecystostomy for ten years was 29 per cent, for cholecystectomy and choledochotomy 60 per cent, for choledochotomy alone 6·2 per cent. In the latter years of the ten-year period the mortality was only 6·3 per cent. The number of recurrences was 17 per cent. In this ten-year period there were 19 operations for cancer of the bile-passages.

Quénu and Mathieu[5] report cases of stone lodged at the bifurcation and branches of the hepatic duct. Beginning with older reports of Cruveilhier, Courvoisier, Langenbuch, and others, they show that the stones in this location are difficult of detection and also of removal. The incision of Kehr was used by them in a number of their reported cases, and seems convenient. Stones may descend from the hepatic duct, produce recurrences in the common duct, and if they are accessible, should be removed at the first operation. Such wounds are difficult of drainage except by packing rather widely open. The prognosis is grave.

Blaxland[6] believes that gall-stones are always concretions around masses of micro-organisms in the gall-tracts. The factor of intestinal stasis causing stagnation in the gall-tracts cannot be ignored in this condition. Also pregnancy produces an extra call on the secretive power of the liver, Naunyn having shown that 90 per cent of women with gall-stones have borne children. Out of many consecutive operations in the Norwich Hospital, numerous cases showed cirrhotic liver, malignant liver, and adhesions. Eighty-one were females, 19 males. A previous attack of typhoid was recorded in 4 cases only. Fifty-three of the cases had a history of jaundice. Local tenderness of the gall-bladder was present in 60 cases. There were 5 fatalities in this series of 100 cases. Cholecystectomy was not made a routine procedure, the chief argument against it being the increased mortality. It is true also that gall-stones may form in the gall-ducts, in spite of the removal of the gall-bladder.

Fink[7] discusses the advisability of choledochotomy by retroduodenal and transduodenal methods, based on experience in the Carlsbad Hospital. Where the stone lies in the retroduodenal part of the common duct, or in the diverticulum of Vater, and is firmly held there, the anterior incision of the duodenum is not so satisfactory as the retroduodenal method. This is particularly true when the duodenum is immobilized by adhesions and inflammation. Often inflammation of the duct and the head of the pancreas makes direct operation upon them difficult. In other cases the more direct route

PLATE XXIII.

X-RAY DIAGNOSIS OF GALL-STONES

(THURSTAN HOLLAND)

From the "Liverpool Medico-Chirurgical Journal"

PLATE XXIV.

X-RAY DIAGNOSIS OF GALL-STONES

(THURSTAN HOLLAND)

From the "Liverpool Medico-Chirurgical Journal"

to the diverticulum is transduodenal through the intraperitoneal part of the bowel wall.

Jacobson[8] thinks that Naunyn's dictum has been too freely accepted. It appears that solitary gall-stones may have a different composition from multiple gall-stones, the former being pure cholesterin, with a nucleus of pigment, the cholesterin arranged in radiating rows, this type being found in non-infected gall-bladders. The multiple stones are laminated, containing cholesterin, lime salts, and pigment, and are the result of infection. Still the pure cholesterin stones may cause mechanical irritation, and later produce infection and chronic irritation, even followed by carcinoma. In his series there were 9 cases of carcinoma. Of these, 2 presented radiating stones, evidently primary to the malignant process. In 2 cases of cancer no stones were found.

W. J. Mayo, reviewing 4000 operations on the gall-bladder, showed that the mortality in this condition was due to complications and delay rather than to the operation for removing the stones, and also that the death-rate is greatly increased when the disease has been allowed to advance. The early removal of gall-stones from a gall-bladder not otherwise diseased is an innocent and simple procedure. Incision and drainage of the gall-bladder is generally a wiser step than excision. Much of the disturbance following operation is due to traction of adhesions on the gall-bladder or biliary ducts.

Holland[9] reports two interesting cases, in which skiagraphy clearly showed the existence of gall-stones (*Plates XXIII, XXIV*). Kidney stones, as a rule, present no difficulties, but the recognition of gall-stones has always been difficult and uncertain with *x* rays. Although the two plates show gall-stones very clearly, the writer warns us that while a positive finding is of importance, the negative finding is of no value whatever. (See also section, RADIO-ACTIVITY AND ELECTRO-THERAPEUTICS.)

REFERENCES.—[1]*Brit. Med. Jour.* 1914, i, 1229; [2]*Med. Press and Circ.* 1914, i, 382; [3]*Jour. Amer. Med. Assoc.* 1914, i, 1880; [4]*Boston Med. and Surg. Jour.* 1913, ii, 571; [5]*Rev. de Chir.* 1914, 105; [6]*Pract.* 1914, i, 646; [7]*Münch. med. Woch.* 1914, 173; [8]*Amer. Jour. Med. Sci.* 1914, ii, 22; [9]*Liverp. Med.-Chir. Jour.* 1914, 308.

GALL-STONES.

X-ray diagnosis of (*p.* 54).

GANGRENE. (*See also* AMPUTATIONS; ARTERIES, SURGERY OF.)

F. W. Goyder, F.R.C.S.

In the first Balkan War, gangrene was so common that many of the surgeons described it as an epidemic. Considerable differences of opinion have been expressed as to the cause. A small percentage only were clear cases of frostbite. Wieting,[1] on the Turkish side, regarded the condition as a cold and not a frost gangrene. It occurred mainly in the lower extremities of debilitated soldiers who had been exposed to cold, privation, and the local effects of tight

leg-wrappings, shrinking wet boots, and ill-cared-for feet. Wieting believes that the first stage is a vaso-paralysis, and that this is followed by local stoppage of the circulation, and gangrene. Actual illness was not necessary in the production of the condition, though it occurred commonly after pneumonia, malaria, and the exanthemata, and especially after typhoid, dysentery, diarrhœa, and cholera. Welcker,[2] with the Bulgarian troops, found so high a percentage following abdominal conditions that he regarded it as a new and special form of gangrene. Dreyer[3] did not regard the disease as due to a single cause, and pointed out that sometimes diarrhœa followed but did not precede the gangrene. Welcker,[4] in a subsequent paper, gives a differential diagnosis between this symmetrical gangrene and gangrene from frost, and reiterates his previous views. On the whole the evidence seems in favour of Wieting's theory. V. Massari and Kronenfels[5] found gangrene from frost-bite very common in the Balkan War. They insist that the most conservative forms of treatment were by far the most economical both of time and of tissue. Even if secondary infections had occurred, acute inflammatory conditions could be got rid of by a few days' rest, and treatment by wet applications. Primary amputations gave bad results, chiefly from infection of the operation area. They recommended secondary corrective procedures in the comparatively few cases in which painful stumps resulted.

Gas Phlegmon.—Goldschmidt[6] reports 10 cases of recovery out of 11 cases treated in the Balkan War. This acute and rapidly spreading form of cellulitis is usually treated by amputation with unsatisfactory results. In the first case treated this was impossible, as the condition had already spread above Poupart's ligament. Accordingly four broad deep incisions were made extending into the sound tissue. The limb was laid at rest and suspended. No bandages were used, but gauze was laid lightly on the wounds, which were irrigated three or four times daily with 6 per cent peroxide of hydrogen solution ; ' electrargol ' injections were also used. The temperature fell on the next day to normal. Owing to the success of this first case, others were similarly treated ; only one was too far gone for recovery. The case should be isolated if possible ; at the slightest sign of spread, further incisions should be made.

Neurovascular Gangrene.—Under this head Bloomfield[7] describes an unusual but very interesting and important disease which is only beginning to receive attention. He regards it as a late stage of Raynaud's disease. Whether this is so or not, the condition is a definite clinical entity, and is sufficiently important to deserve recognition. What so often is considered a distinct disease entity is in reality only a stage, a manifestation of the phenomenon first thoroughly elaborated by Raynaud. Of thirty cases, what at first in some appeared to be purely erythromelalgia, after the lapse of five years presented the typical symptoms of Raynaud's phenomenon, eventually terminating in characteristic gangrene of a

member, and finally in amputation with fatality in most cases. The disease is most prevalent amongst Hebrews (28 out of 30). The average age is about thirty years. Males are more frequently affected. The history includes a neuropathic proclivity as well as exposure to severe weather, nearly always some infectious disease, and a rheumatic family ancestry. Lues was denied by all. All were married and had large families except two ; they were all hard working and abstemious. Most had long hours of standing, or work requiring pressure by the feet, or were exposed to the severities of all weathers. There was no history of ergot or of any other drug ; all smoked, but not excessively.

This disease may manifest itself in three forms : regional ischæmia, regional cyanosis, and regional hyperæmia. The attack may be so slight as to pass off without the slightest cognizance by the patient. Occasionally it exhibits, as its initial manifestations, severe cramps and stiffness ; it usually continues with the complaint of insomnia, peculiar pain, a burning sensation in the toe or toes, occasionally the heels ; not infrequently in the malleolus is a smarting, stinging sensation, deeply underneath, which is not painful to the touch. The foot is as cold as ice. To outward appearance the patient looks well nourished ; his manner seldom betrays the state of discomfort he is in ; a peculiar mental state of carelessness often comes over the patient. The toes are as white as a dead member. When the foot is hanging down, the pale colour disappears and is replaced by a deep purplish blue. When local asphyxia is fully established, a bluish black replaces the pale colour. An actual play of colours may occur over the entire affected limb, especially when the patient changes the position of the leg. The entire lower limb may be mummified, yet the lumen of the veins and arteries be unobstructed. The affected area is usually swollen. This swelling occasionally disappears. There will be times when the patient is temporarily free from discomfort, but more often he is haggard-looking, and has not slept except for occasional minute naps. In advanced cases the patients seldom sleep in bed. They may sit for hours and days without ever going to bed. Painful crises may last several weeks, no medicinal or mechanical measure being able to relieve the suffering. On examining the toe carefully, a small vesicle or ulcer, or simply what looks like a little serum exuding from the margin of the nail, may be seen. When an ulcer is present it will be months before it will heal, if it ever does. This ulcer gradually develops a gangrenous character which is almost characteristic of the disease ; it is limited to a small area around the affected phalanx. The opposite extremity at the same time may show the same signs of beginning trouble, but this is not frequent during the first few weeks of the disease. At times, besides the gangrenous spot on the phalanx, the tip of the nose, the lobe of the ear, the head of the penis, the tip of the tongue, or even the nipple may become affected. The pain in this affection is characteristic. The symptoms are intermittent. The termination of all appears to

be gangrene, and 90 per cent of the cases ended fatally. Bloomfield believes that if amputation were done early much suffering would be prevented and a greater number of cases saved. Mental diversion and heat, with plenty of nourishment, are the best general measures.

REFERENCES.—[1]*Centr. f. Chir.* 1913, 1985; [2]*Ibid.* 1625; [3]*Ibid.* 1628; [4]*Ibid.* 1769; [5]*Wien. klin. Woch.* 1913, 1794; [6]*Ibid.* 1914, 1026; [7]*Med. Rec.* 1903, ii, 820.

GAS PHLEGMON. (*See* GANGRENE.)

GASTRIC CONTENTS. *O. C. Gruner, M.D.*

The value of special methods of procedure in the study of gastric contents is brought out by Nicolaysen.[1] This authority gives great prominence to the Gluzinski routine of analysis, as a method of testing the functional power of the mucous membrane of the stomach in respect of hydrochloric acid. He points out that no test can be rightly looked upon as a test for a given disease, but that the clinician should always take this or other tests in the light of information upon this or that functional power of an organ.

In the Gluzinski method three washings are taken, the first on the empty stomach, the second after a test-breakfast of albumen-water (boiled white of one egg plus seven ounces of water), the third after a test dinner (beef and ten ounces of water). The second washing is taken three-quarters of an hour after the meal, the third three hours and three-quarters after it. The total acidity and the free hydrochloric acid are tested in each specimen, using decinormal soda, and phenolphthalein and dimethylamidoazobenzene, as indicators respectively. The analysis is simple, and involves only about five minutes for the three washings. The only objection to the procedure is the triple passing of the tube. The point to observe in the final readings is whether the total acidity is increased or diminished after the second washing, and whether the free HCl is altered. In cases of ulcer both are increased; in cancer of the stomach, only the total acidity is increased, the free HCl being diminished. In enteroptosis with obstruction, the total acidity is diminished, but the free HCl diminishes also; if there be no obstruction, both are increased —the total acidity more than the hydrochloric acid. These points are brought out in the accompanying chart (*Fig.* 51).

Nicolaysen points out that it is possible to differentiate between ulcer and other dyspepsias by noting that in ulcer the actual figure for free HCl is high in the third washing. It is not possible to differentiate between gastric and duodenal ulcer by this process. In regard to the diagnosis of cancer of the stomach, this observer emphasizes the truism that the early diagnosis does not depend on any signs or symptoms due to the cancer itself (but see below under *Cytology*).

Wolff-Junghans's test has been thoroughly studied by Smithies.[2] Its value may be summed up as follows: Dissolved albumin occurs in gastric extracts in 80 per cent of cancer cases. It is inconstant in

other conditions of the stomach, as well as in extragastric malignant disease. It is more constant than the absence of HCl, the presence of lactic acid, and the glycyltryptophan test. It is not more constant than the finding of Oppler-Boas bacilli, or the increase of the formol index. The only source of confusion is that simple gastric and duodenal ulcers may give rise to the reaction, especially if accompanied by pyloric stenosis or gastric atony. The presence of blood sometimes interferes with the test.

Rehfuss[3] recommends the use of a *metal capsule* specially designed by him for gastric diagnosis. It is swallowed after being charged with capillary tubes filled with various reagents (e.g., agar, egg-white, treated

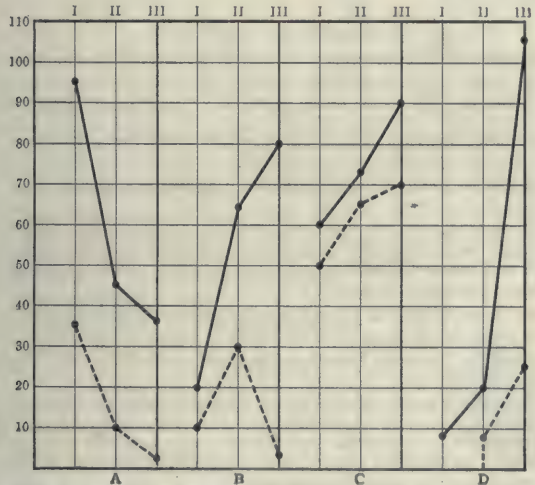


Fig. 51.—Diagrams of the acid values in the gastric contents; (I) recovered from a fasting patient; (II) recovered after the test breakfast; (III) recovered after the test dinner. Gluzinski method. A and B are from cases of gastric cancer, C from a case of gastric ulcer, D from a case of enteroptosis without obstruction. The black line represents the total acidity in terms of decinormal soda per 100 c.c. gastric contents; the dotted line represents the free HCl recorded in the same manner. The two cancer cases are shown in order to demonstrate that though the total acidity falls in the one and rises in the other, both have a fall of HCl from II to III in common. In the ulcer case, the essential feature is the height of the curves above the abscissa.

with indicators). The capsule is withdrawn by means of a silk cord after ten to fifteen minutes. If left for one or two hours it will make its way into the duodenum, and can thus be employed for testing the duodenal contents. The inventor considers that this is more satisfactory in every way than the use of a stomach tube.

Meunier[4] discusses the use of *cryoscopy* of the gastric contents. The main interest of the paper lies in his observations about the concentration in which certain drugs should be administered in particular cases of gastric intolerance.

Basch[5] advocates the use of *carmine* as a test for gastric motility; it is administered in capsules (7 gr.), and the time which elapses before its appearance in the stool is noted. There are obvious fallacies to contend with.

Cytology of Gastric Contents.—An exceedingly valuable contribution to the clinical pathology of the gastric contents is to be found in a paper by Caussade.[6] This observer refers to the fact that the cytology of gastric washings should receive as much attention as that of other secretions and excretions. Marini is quoted as having devised a suitable technique, in that stains are employed for the identification of cancer cells, etc.

[It is worth while pointing out that the studies of clinical pathology carried on in the French universities are deserving of very close attention, not only because of the treasury of knowledge found there, but because of the clarity of diction which characterizes their writings.—O. C. G.]

EXPLANATION OF PLATE XXV.

(The drawings are prepared from a series of twenty in Caussade's paper.[6]*)*

Field 1.—The normal cytological formula, showing squamous cells, free nuclei, and débris. The squamous cells belong to either buccal cavity, pharynx, or œsophagus. Bacilli and neutrophiles often lie on these large cells. The only difference between the buccal and the œsophageal cells is that in the latter case the nucleus is larger and the cell body smaller (cell in left-hand bottom corner).

Field 2.—Normal gastric epithelium, showing different stages of activity. Several goblet cells are seen, containing much secretion. The smaller cells are empty goblet cells; (*a*) is an ordinary secretory gastric cell.

Field 3.—Cell types met with in gastritis. (*a*) Altered mucosal gastric cells; (*b*) Respiratory epithelium, containing carbon pigment; (*c*) Goblet cell; (*d*) Empty goblet cells—one is fatty. A few leucocytes are seen, many nuclear fragments, and free nuclei. Two small squamous cells and some undifferentiated detritus are shown.

Field 4.—From a case of atrophic gastritis, showing paucity of cell elements.

Field 5.—A case of gastric ulcer. (*a*) Leucocytes of various types; (*b*) Cells of the surface of the gastric mucosa; (*c*) Secretory cells from the gastric glands; (*d*) Free red blood cells. A pavement epithelial cell is shown.

Field 6.—From a case of gastric cancer. All the larger cells shown are cancer cells. The picture is filled in with fragments of free nuclei and red blood cells. Some of the tumour cells shown tend to a columnar form, others to a spheroidal type, and others are irregular. Glycogen may be tested for, if desired, to prove the cancerous nature, but the means of identification of the cell, apart from its mass, is the relatively and absolutely large nucleus.

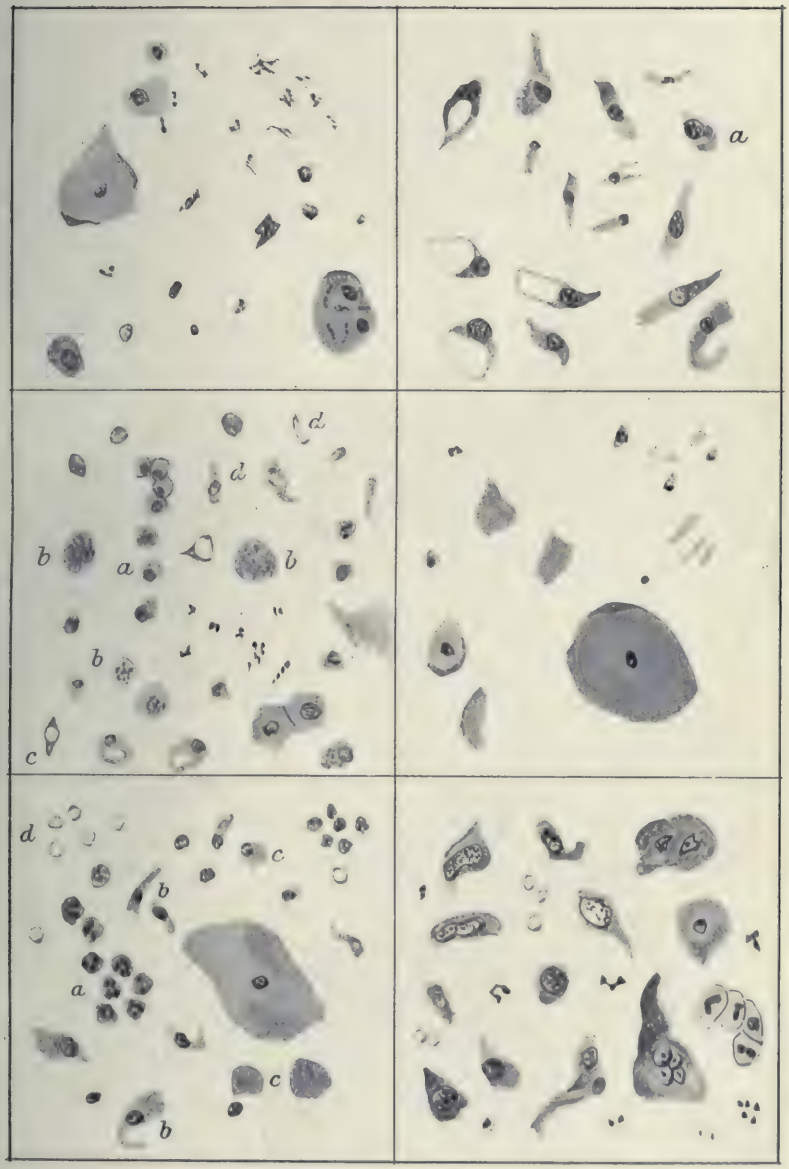
The preparations from which the original illustrations are made are stained with hæmatoxylin and eosin, and mounted in glycerin. The Pappenheim panoptic method may be strongly recommended also.

The first matter of importance in technique lies in the thorough mixing of the contents of the stomach before they are aspirated. The patient should therefore sit up and lie down alternately several times before the tube is passed. Secondly, the stomach should be thoroughly emptied, the last drops being the important ones. Thirdly, the material should be stained wet, by centrifuging with hæmatoxylin followed by eosin. It is mounted in glycerin. The accompanying drawings (*Plate XXV.*) indicate the possible findings.

A typical cytological formula may be met with even in cases of gastric disturbance, such as nervous dyspepsia, the gastric crises of tabes, in motor troubles, ptosis, and some cases of atrophy of the mucosa. The most characteristic findings are obtained in inflammatory conditions of the gastric wall. The severity of the lesions is indicated by the greater number of epithelial cells. This depends for its assessment, however, upon the personal factor.

PLATE XXV.

CYTOLOGY OF GASTRIC CONTENTS



O. C. Gruner

One of the most important conclusions arrived at by Caussade is that many of the so-called functional dyspepsias are really produced by organic changes in the mucosa. The figured cancer cells which are stated to be constant in gastric cancer are of much interest, and should stimulate the clinician to a closer study of such material. If there are no signs of fermentation, if there are few cell elements, if there are few or no polynuclears, and no atypical cells, the clinician may be quite sure it is not cancer of the stomach. This dogmatic statement is made without hesitation, being based on the experience of numbers of cases, as well as on the circumstance that gastric cancer ulcerates early.

REFERENCES.—[1]*Ann. Surg.* 1914, i, 821 ; [2]*Amer. Jour. Med. Sci.* 1914, i, 713 ; [3]*Ibid.* 848 ; [4]*Presse M d.* 1914, 391 ; [5]*Arch. f. Verdauungskrankh.* Bd. xx, 1 ; [6]*Rev. de Méd.* 1914, 428.

GASTRIC AND DUODENAL ULCER. (*See also* DUODENAL ULCER.)

Robert Hutchison, M.D., F.R.C.P.

Christopher Graham[1] presents a valuable analysis of all the cases of gastric and duodenal ulcer ('peptic ulcers') operated upon at the Mayo clinic during the years 1906 to 1911 inclusive. He says it may be quite impossible to differentiate cases of gastric from duodenal ulcer clinically, or to distinguish between either of these and other lesions causing gastric symptoms, but in making a diagnosis the clinical history is still the best guide. The typical *diagnostic symptoms* of an ulcer (gastric or duodenal) are : (1) The periodicity of the attacks, with perfect intermission or marked remission of symptoms between them ; (2) The almost exact similarity of the symptoms from day to day during the attack ; (3) The marked relation of the symptoms to the ingestion of food (half an hour to four hours after) ; (4) The control of symptoms by food, lavage, alkalies, recumbency, and rest.

"The types of cases in which it is particularly difficult to reach a correct diagnosis, or in which it is quite impossible to differentiate from other lesions causing gastric symptoms may be divided into four groups :—

"*Group* 1.—This group comprises those patients with ulcers who give the classic symptoms of gall-stones, and in whom no other gastric symptom can be elicited. There may be perforations, or the pain may be due to acidity and accompanying spasm. The lesions are usually chronic, and may be located at any point in the stomach or duodenum. At operation, perforation has been found in about one-third of this group (35 per cent duodenal, 29 per cent gastric), and in some of these, at least, the pain has not been more intense than in those not found perforated at operation. Severe pain may be complained of and no perforation be evident. Patients with this symptom-complex constitute about 5 per cent of all the cases. In them the diagnosis of gall-stones is the only logical one to be made. Careful clinical research and radiography should lessen our errors.

"*Group* 2.—In this group may be found patients in whom the ulcer

must have been latent for weeks or months, and whose first manifest symptoms were those of chronic ulcer with complications (hæmorrhage, perforation, etc.). The symptom-complex in these cases is irregular, and quite excludes the pathognomonic picture of ulcer.

"*Group* 3.—In these cases the present chronic symptoms are very severe. The early symptoms were so mild that they may have been quite forgotten or overlooked by the patient. Many such patients will not allude to the early trouble unless carefully questioned, because nothing is of so much importance to them as the present, or recent years of distressing pain.

"*Group* 4.—In this group are those patients whose symptoms are of a more or less malignant type—marked loss of flesh and strength, pain or distress quite continuous, gas rather annoying, and vomiting of large amounts at irregular periods. The vomitus consists of food, fairly macerated, perhaps dark, coffee-ground colour, and the liquid quantity quite in excess of fluid ingested. If to these symptoms is added the presence of tumour, we are inclined to err in diagnosis and consider cancer first. Three per cent of all ulcers in this series were diagnosed cancer. Five per cent had gross tumours, three per cent more or less feeling of a ridge.

"The cases in these groups may be variously diagnosed as acute or chronic gall-stone disease, gastric ulcer, chronic appendicitis, tuberculous intestinal involvement, or cancer, according to the variation of the symptoms. Here, too, by a more careful attention to clinical histories and more frequent use of the *x* ray we should materially lessen our errors. In diagnosing atypical cases, one should take into consideration the variations in symptoms. The following groups suggest themselves: (1) Those cases of a clear-cut gall-stone type; (2) Those which were chronic and complicated since the first symptoms appeared, i.e., chronic ulcers long latent; (3) Those in which the ulcer is high on the gastric wall and tends to continuous symptoms without food ease; and (4) Cardiac ulcer usually with but slight symptoms until obstruction appears. However, the general picture is so clear that 80 per cent of all ulcers may be followed closely enough to establish an accurate clinical diagnosis, and a probable diagnosis may be consistently made in the remainder."

Results of Operation.—Graham's statistics are based on the reports received from 600 cases of duodenal and gastric ulcer out of a total of 816. The shortest period since operation in these cases is now nearly two years. Of the patients with ulcer operated on during the years 1906–1911 inclusive, 76 per cent were males and 24 per cent were females. Of the males, 70 per cent of all ulcers were duodenal or involved the duodenum. Of the females, 60 per cent of all ulcers were duodenal or involved it.

Out of a total of 567 cases of *duodenal ulcer* operated on during a period of six years (1906–11), information has been received concerning 438. The classified results of these data are as follows: 307, or 70 per cent cured, 18 per cent much improved, 9 per cent

fair, 3 per cent unimproved. A percentage of 88, therefore, were cured or much improved. In 440 of the cases the ulcer was confined to the duodenum. Of these 337 were heard from : 70 per cent were cured, 16 per cent much improved, 11 per cent fair, and 3 per cent not improved. In the remaining 127 cases the ulcer extended to or involved the pylorus, and of these 72 per cent were cured, 24 per cent much improved, 3 per cent fair, and 1 per cent unimproved. That is, 86 per cent of the former were cured or had made satisfactory improvement, whereas, in the latter group, in which the lesion was more extensive, 96 per cent were cured or much improved.

There were 249 cases of *gastric ulcer*, and reports were received from 162. These were grouped according to their situation : (1) 52 in or at the pylorus (pyloric ulcer), and (2) 197 in other parts of the stomach (principally the lesser curvature). Taken collectively, 95, or 59 per cent of this series were cured, 21 per cent were much improved, 13 per cent showed fair improvement, and 7 per cent were unimproved. Therefore, 80 per cent were either cured or much improved, 93 per cent were benefited, and 7 per cent not improved.

The more the ulcer tends to involve the pylorus, and the greater the degree of obstruction at the latter, the better are the results of operation. Thus the percentage of cured and improved cases of duodenal ulcer with obstruction was 94, without obstruction 85. In the cases of gastric ulcer the respective figures were 92 and 74 per cent.

Actual recurrence of an ulcer following a properly performed gastro-enterostomy is rare, but it has been noted in a few cases when there was no obstruction of the pylorus at the time of the primary operation. In another small group a secondary operation was necessary owing to the formation of a new ulcer at the site of the anastomosis. Finally, one has to distinguish between a complete and a ' practical ' cure in these cases. The cure is relative and depends on various circumstances, and although the patient may be freed from disease and his life prolonged, yet he may not be freed from symptoms altogether.

Verbrycke[2] regards the presence of *occult blood in the stools* as the most important single sign of gastric ulcer. It was present in 22 out of 25 of his cases, and examination at intervals will reveal it at some time in practically every case.

References.—[1]*Boston Med. and Surg. Jour.* 1914, 221 ; [2]*Surg. Gyn. and Obst.* 1914, ii, 370.

GAUCHER'S DISEASE. (*See* Splenomegaly.)

GENERAL PARALYSIS. (*See also* Syphilis, Cerebrospinal)

Bedford Pierce, M.D., F.R.C.P.

That syphilis is a necessary antecedent of general paralysis is now generally admitted. Noguchi's demonstration of the spirochæte in the brains of persons dying of general paralysis has been confirmed on all sides. Several problems connected with this subject are still unsolved, amongst which may be mentioned : Where is the specific organism during the ten or more years that elapse between the infec-

tion and the earliest manifestations of nervous disease? How is it that careful treatment by mercury during the acute stage does not appear to prevent general paralysis? Why are ordinary tertiary symptoms of syphilis rare in general paralysis? Why is the initial attack of syphilis often extremely mild, and may be unrecognized, although the existence of a decided Wassermann reaction seems to leave no room for doubt as to the diagnosis? Lastly, the influence of secondary infections by other organisms remains very obscure, and there is reason to think that many of the later symptoms may arise from these rather than the specific organism of syphilis.

Mott[1] states that the spirochætes can be found in the emulsions of fresh brains when examined by the ultra-microscope as easily as in the primary sore of syphilis. In some cases they can be seen moving sluggishly. They do not differ morphologically from those obtained from a primary sore or a syphilitic organ. He states that Förster and Tomaczewski have by puncture obtained the organism from the living brain in 40 per cent of cases, and he has no doubt that if time be given to the search they could be found in all cases exhibiting the Wassermann reaction. Mott finds the spirochæte chiefly in minute foci in the grey matter, usually of a reddish-grey colour, and softer than the surrounding parts. They are more easily found in recent acute maniacal cases than the chronic long-standing demented forms of general paralysis. As regards the organism itself, he describes it as a protozoon which he would consider as an independent group of the *protista*. In some cases he describes, spirochætes filled with granules indicate a spore formation, but the very minute size of these makes examination extremely difficult.

As to the causation of the symptoms, Mott considers that the multiplication of spirochætes leads to the production of toxins which cause cortical irritation and meningo-encephalitis, with perivascular infiltration of lymphocytes and plasma cells. The motor symptoms, excitement, and fits occur as a direct consequence of this cortical inflammation. This may lead to chronic necrosis of nervous elements and substitutive neuroglial proliferation. No doubt antibodies are produced, to which may be attributed the remarkable remissions of general paralysis, whilst the extent of dementia observed during the remission corresponds with the distribution and extent of destruction of nervous tissue. Relapses are looked upon as due to secondary infections from spores and latent spirochætes.

With reference to treatment, Mott states that neither mercury nor antimony can pass from the blood into the cerebrospinal fluid, and he doubts whether the introduction of **Salvarsan Serum** by lumbar puncture will be found of value. He appears to approve of the proposal to trephine and inject the serum directly into the fronto-central regions of the brain. McIntosh and Fildes[2] show that there is no fixation of salvarsan or neosalvarsan in the brain after intravenous injection. The suggestion was made by Ehrlich at the Berlin Congress that the molecule of salvarsan is probably too large to pass through endothelial membranes.

Shaw Bolton[3] does not controvert the doctrine "no syphilis, no general paralysis," yet he does not consider that syphilis is the sole cause of the malady. He says: "Dementia paralytica is a branch of mental disease, and its subjects would, if they had not been syphilized, have suffered from one or other types of primary neuronic dementia." He states that the morbid anatomy of dementia paralytica does not differ essentially from that of progressive senile dementia, and that a comparison of the clinical types of dementia paralytica with varieties of primarily neuronic dementia shows that the two series are homologous. A high percentage of heredity of insanity and of family degeneracy can be obtained in this disease, and in certain types cerebral under-development occurs. He therefore comes to the conclusion that "the ordinary sane individual and the ordinary psychopath or potential lunatic, if possessed of cortical neurones of average durability, may suffer from syphilis with impunity as regards the future onset of dementia paralytica"; and on the other hand, he holds the opinion that "a psychopath who possesses cortical neurones of subnormal durability, and who apart from the infection of syphilis would develop a moderate grade of dementia, would, after acquiring that disease, sooner or later suffer from one or other of the forms of dementia paralytica." This view of the subject is interesting, and it is certainly important to keep constantly before us the nature of the soil as well as the specific character of the virus; but the doctrine enunciated is not easy to accept without much more evidence than has been supplied at present, seeing that so many stricken with general paralysis are exceptional men coming of healthy stock.

Marie and Levaditi[4] report twelve cases of general paralysis treated intrameningeally with **Salvarsanized Serum.** A rabbit is injected intravenously with 0·07 gram to the kilogram of body weight. An hour later the blood is withdrawn and the serum decanted. The skull of the patient is trephined in the anterior temporal region on each side, and 5 c.c. of the serum are introduced beneath the dura. The serum is injected slowly on both sides, and directed at first forwards and then towards the parietal region. Severe reaction followed within a few hours: fever, vomiting, partial convulsions, and later catatonic states. These symptoms quickly cleared up, and decided improvement followed. In all cases there was marked benefit, but it is clearly stated that it is too early to say whether the improvement is permanent.

The same authors[5] have discussed the question whether the treponema of general paralysis is biologically the same as that found in syphilis. They relate a series of experiments which suggest that there is a special micro-organism in general paralysis which produces lesions differing in many particulars from Truffi's syphilitic virus. Blood from a case of general paralysis was injected into the scrotum of several rabbits, and in one case cutaneous lesions containing spirochætes were produced. The effects of this virus on rabbits were compared with those of Truffi's virus, and the following differences

noted : The incubation period was longer in the case of the virus of general paralysis ; the lesions were more superficial, scaly, and not indurated ; and the treponema showed a preference for the superficial layers of the skin. The lesions healed extremely slowly. The virus, unlike Truffi's, did not infect apes, but only rabbits. There was reason to think that neither virus produced immunity from infection by the other. It is suggested that general paralysis is due to a special variety of the *Treponema pallidum* possessing special affinity for nervous tissues.

If these experiments are confirmed, they will clear up many of the problems connected with general paralysis. It has long been noted that the primary symptoms of syphilis are often exceedingly mild in those cases which later become paralytic ; also that tertiary and other typical syphilitic lesions are very rarely met with in general paralysis. Lastly, it has been clearly established that a considerable number of cases of general paralysis have been traced to one distinct source of infection. If it be demonstrated that the primary lesion is a specific superficial cutaneous lesion, it raises the question that the disease may be transmitted by contact much more easily than ordinary syphilis, the special organism of which is said to lie in the deeper layer of the skin. Everyone who has taken the histories of general paralytics will have met with many cases in which even after the most exhaustive inquiry no history of syphilis or of any sexual irregularity could be elicited. To explain this well-known fact, it has been suggested that some of these are in reality congenital cases with delayed appearance of symptoms. It is much simpler to suppose that the infection occurred in some innocent accidental manner, and that the initial skin symptoms were either ignored or forgotten.

REFERENCES.—[1]*Lancet*, 1914, ii, 75 ; [2]*Nature*, 1914, 356 ; [3]*The Brain in Health and Disease*, 441 ; [4]*Bull. Soc. Clin. Med. Ment.* 1914, Feb.; [5]*Ibid.* June.

GLANDERS. *Herbert French, M.D., F.R.C.P.*

Woodward and Clarke[1] comment upon the fact that glanders often presents itself in obscure ways, simulating first one disease and then another, and generally being quite unlike the ordinary text-book description. They give details of three cases treated at St. John's Hospital, Lewisham, all admitted for severe pyrexia without anything to be discovered upon physical examination, and they believe that glanders may be much more common than is supposed, large numbers of fatal cases of septicæmia and pyæmia occurring throughout the country every year without any bacteriological diagnosis being made or even attempted. In one of their cases the fact of the illness being glanders was verified comparatively early by means of cultures prepared from the urine ; the possibility of discovering the causal organism of septicæmia or pyæmia in the urine, into which it is being excreted by the kidneys from the blood-stream, is an important method of diagnosis which might be resorted to more frequently.

REFERENCE.—[1]*Lancet*, 1913, ii, 1696.

GLANDULAR FEVER. *E. W. Goodall, M.D.*

A. Campbell Stack,[1] writing in January, 1914, states that he had recently met with a small epidemic of this disease, thirty cases, in Wanstead Park, London. In none were the tonsils involved. The glands in the neck were enlarged to the size of a Tangerine orange. He found the disease highly infectious ; in no instance did a child escape who was brought into contact with an active case. The treatment consisted of a **Calomel** purge and small doses of **Salicylate of Sodium,** followed by **Iron** when the fever had subsided All the patients made a good recovery.

Reference.—[1]*Brit. Med. Jour.* 1914, i, 195.

GLAUCOMA. *A. Hugh Thompson, M.D.*

So much attention has lately been directed to the newer operation for glaucoma that there is some risk that the non-operative treatment may be too much ignored. Posey,[1] of Philadelphia, has for years been a strong advocate of miotics in preference to iridectomy when the former can be effectively employed, and he continues to preach the same doctrine. It is admitted by all that the earlier a case of glaucoma comes under treatment the better the prognosis, whether the treatment be operative or non-operative. Of twenty-seven cases treated from the early stage by miotics, Posey found that all but three retained nearly normal fields and vision as long as they remained under observation. One of them had been observed for twenty-one years, four for eighteen years, and eight for ten years or more. Cases in which the disease is further advanced when first taken in hand do not, naturally, show such good results, whatever treatment is adopted. Yet in five far-advanced cases treated by miotics, vision was maintained in one case for ten years without further loss, in another for a similar period with only slight loss, and in the remaining three for periods of one to six years. This treatment is advocated by Posey in those cases only which show no congestive symptoms, these being an indication for operation. The method of administering miotics is important. Posey says:—

" Beginning in doses small enough to avoid creating spasm of the ciliary muscle, and rapidly increasing the dose until the pupil of the affected eye is strongly contracted, this degree of contraction should be maintained as long as life lasts by gradually increasing the strength of the solution, from time to time, and by instillations of the drug at intervals of three or four hours. The miotics which are best adapted to control intra-ocular tension are **Physostigmine** (eserine) **Salicylate,** and **Pilocarpine Nitrate.** This salt of physostigmine is more persistent in its effects and less changeable in solution than other salts of the drug, and is less irritating to the conjunctiva. I prescribe a solution of pilocarpine to be used about every four hours, morning, noon, and evening, and one of physostigmine of twice the strength at bedtime, thereby avoiding in a measure the blurring of vision which is occasioned by the action of the physostig-

mine on the ciliary muscle during the day, while the eye receives the greatest effect of the drug during the eight hours or more which elapse between the instillation of the drops during the night. In incipient cases of the disease, an excellent initial dose is $\frac{1}{5}$ gr. of pilocarpine to the ounce of water. The strength should be gradually increased so that at the end of a year 1 gr. to the ounce is employed, at the end of the second year 2 gr, and at the end of the third year 3 gr. to the ounce solution. This strength will suffice to maintain the pupils at the desired point of almost pin-point contraction."

The prestige of Elliot's operation of **Sclero-corneal Trephining** is now established on a very wide basis of experience,[2] but the inevitable reaction in favour of the older method of **Iridectomy** has begun to make itself heard. At the last Oxford Ophthalmological Congress, Jameson Evans and Harrison Butler[3] contributed a paper giving the results of 161 operations for acute and chronic glaucoma by various methods, from which it appeared that the results of iridectomies were appreciably better than those of trephinings, and this in chronic as well as acute cases. It has been argued that, since iridectomy forms a part of the Eliott operation, a simple iridectomy must necessarily be a less severe operation, but this argument leaves out of account the fact that the established iridectomy for glaucoma is a *large* iridectomy, and therefore quite different, both in its technique and in its effects, from the very small iridectomy which Elliot recommends as part of his operation.

A more serious criticism is the danger of late infection after trephining. Instances of this have been recorded in this country by Gray Clegg and Hill Griffith—serious cases leading to complete loss of sight in the affected eye,—in America by Gifford and Casey Wood. It seems probable that this danger is especially to be feared after any operation involving a fistula from the anterior chamber to the subconjunctival space. It is less likely to exist after an operation well than ill done, and in this connection it is important that the conjunctival flap should be both large and correctly fashioned ; otherwise a projecting vesicular scar may result, and this, though it may be efficient in reducing tension, is obviously an added source of danger to the eye. It should be regarded, according to Elliot, as evidence of an inefficient technique. In order to avoid it, he recommends that, in cutting the conjunctival flap, instead of the whole area of the flap being dissected up, only so much should be separated from the underlying sclera as is necessary. "The path of the dissection, from the conjunctival incision as a base to the limbus, must resemble in shape a truncated triangle, very wide above, and gradually narrowing below until it reaches the cornea, when its width is only sufficient to allow of our having comfortable room to carry out the necessary manipulation for the splitting of the cornea." Further, while the upper part of the flap should be cut thin, as we approach the cornea we should make it thicker, laying bare the sclera for the last few millimetres of the dissection. It is essential, of course, that no button-hole should

be made. There is a certain risk of doing this at the moment that we cut away the disc of sclera that the trephine hole has made, and in order to ensure against it, Elliot recommends us to press more on the lower half of the trephine blade than the upper, in order that the disc of sclera may be wholly separated from the corneal margin by the trephine, only needing the scissors to separate the scleral margin. Even when all precautions have been taken, it is advisable for the patient to adopt a routine of daily douching for the remainder of his life.

In order to secure efficient drainage after trephining, Cruise[4] adopts the device of leaving a loose strand of suture in the subconjunctival space. Another method of securing a fistula which has been practised by some operators in this country since it was demonstrated at the Oxford Ophthalmological Congress of 1910, is the 'punch' operation[5] devised by Professor Holth, of Christiania. Zorab[6] has obtained successful results from his operation of '**Aqueoplasty**,' which consists in inserting a loop of silk thread as a permanent drain from the anterior chamber to the subconjunctival space. Herbert's 'wedge' and 'small flap' operations and Harman's modification of the latter have been described in earlier volumes of this ANNUAL. At present, where operative treatment is indicated at all, for the majority of surgeons the choice will lie between a classical iridectomy on the one hand and Elliot's operation on the other. In the description of this operation in the MEDICAL ANNUAL for 1913, the figure of the conjunctival flap on p. 257 requires modification. The lateral limits of the flap should not be extended to the corneal margin as there indicated, but a space should be left on each side through which drainage from the trephine hole can proceed through a subconjunctival space which has not been interfered with surgically. With regard to the trephine hole itself, Treacher Collins[7] points out that the first essential factor in the formation of a permanent filtration scar is to establish a permanent gap in the endothelium lining Descemet's membrane. "I have found experimentally that the line of junction between clear cornea and opaque sclerotic on the surface of the globe is 1 mm. internal to the position where Descemet's membrane commences to split up into the fibres of the ligamentum pectinatum. If therefore a 1·5 mm. trephine is used, and the centre of it is placed over the margin of the cornea on the surface of the globe, a complete disc of Descemet's membrane will be found on the posterior surface of the piece excised." If, from any defect in the operation, the disc is only incompletely removed, the gap in Descemet's membrane may not be sufficiently wide to prevent the restoration of its continuity, and the condition of high tension may recur.

Hereditary Chronic Glaucoma.—Calhoun[8] gives a further instance of a family affected with chronic glaucoma involving eight members belonging to three generations. Similar cases have previously been reported by Lawford, Nettleship, and others. A feature common to them all is 'anticipation,' the disease affecting the later generations at an earlier age than the earlier ones. Whenever a case of glaucoma

is recognized in anyone under the age of thirty, interest should be aroused as to the hereditary tendency.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 219 ; [2]*Brit. Med. Jour.* 1914, i, 910 ; [3]*Ophthalmoscope*, 1914, 467 ; [4]*Trans. Roy. Soc. Med.* (*Ophth. Sect.*), vi, 102 ; [5]*Ophthalmoscope*, ix, 487 ; [6]*Ibid.* 1913, 211 ; [7]*Ibid.* 1914 ; [8]*Jour. Amer. Med. Assoc.* 1914, 209.

GLOSSITIS, SYPHILITIC.

(*Vol.* 1913, *p.* 477)—Success was achieved by using **Salvarsan** as a local application as well as by injecting it intravenously.

GLYCOSURIA. (*See* Diabetes.)

GOITRE, EXOPHTHALMIC. *Herbert French, M.D., F.R.C.P.*

Most clinicians have personal experience of cases in which all the symptoms of Graves's disease have ultimately developed in patients who for many years previously have been the subjects of 'simple' goitre. From the clinical point of view the explanation of this is that there is no hard-and-fast line at which 'simple' goitre ends and 'exophthalmic' goitre begins, the two merging and sometimes becoming transformed from one type into the other, in a way that suggests that there is no great intrinsic difference, but only one of degree. So-called 'larval' Graves's disease comes between the two. Pathologists, however, do not agree with this clinical point of view, and contend that certain 'hyperplastic' microscopical appearances in sections of the gland are essential before the terms exophthalmic goitre or Graves's disease are to be applied to the condition with which the goitre is associated. Upon this view, maintained by Plummer[1] as a result of his analysis of the histological findings in 3207 cases operated upon in the Mayo clinic, it becomes necessary to allow that there are two kinds of exophthalmic goitre, each presenting similar symptoms, but one associated with hyperplastic, and the other with non-hyperplastic, changes in the gland. This raises the question as to whether the clinical or the histological test is the more certain in diagnosing Graves's disease. Plummer and his colleagues[2] appear to decide the diagnosis between true or false Graves's disease solely by the presence or absence of hyperplastic changes in gland-sections ; it would seem more reasonable, however, to allow that there is no constant histology in Graves's disease, some of the thyroid glands presenting hyperplasia, others none.

Some indication of a likely connecting link between 'simple' and 'exophthalmic' goitre is suggested by Farrant,[3] whose work upon the subject goes to show that the primary cause of both is bacterial toxæmia, derived in some cases from drinking water, in others from pyorrhœa alveolaris ; in others, again, from chronic lung infections, in others from the intestine, and so on. His views are based upon a study, bacteriological and otherwise, of eighty-five English cases of goitre ; and, so far as they go, they confirm the experiences of McCarrison in regard to the microbic-toxæmic nature of goitre as studied by him in the Gilgit Valley. Some toxæmias produce no thyroid changes at

all; others cause alterations in the gland which may stop short at the 'simple' stage, or may progress to the hyperplastic or exophthalmic stage either at once, or after an interval during which the thyroid changes have been apparently only 'simple.' If this is so, it is more important to discover the causal toxæmia and cure it in a case of goitre, simple or exophthalmic, than it is to remove part of the affected gland. Cessation of the toxæmia will, in Farrant's opinion, lead to cessation in the thyroid-gland changes, a return of the abnormal gland to a relatively normal state, and a cure of the patient—such as often comes about spontaneously. The important point, according to him, is to search for and cure the source of the toxæmia; and amongst other things, bacteriological examinations of the fæces are very important in this connection.

The fact that the thymus gland is persistent, and often greatly enlarged, in over 80 per cent of all cases of Graves's disease, has long been familiar; but it is only of recent years that surgeons have begun to direct their attention to removal of part or the whole of the thymus gland in addition to thyroidectomy, in the practical treatment of the disease. The matter is still in the experimental stage; but there are already a fair number of recorded cases in which both **Thyroidectomy and Thymectomy** have been performed for Graves's disease. Halsted[4] has published a long paper upon the subject, including in it a number of cases of his own as well as notes of those recorded by others. His general conclusion is that thymectomy, in addition to thyroidectomy, is much more beneficial than the latter operation alone. [It remains to be seen whether this proves to be the experience of others also. One big point that is too often lost sight of, largely because the facts are observed by general practitioners rather than by hospital surgeons or physicians, is that a very considerable number of cases of Graves's disease get perfectly well without any operative treatment at all.—H. F.]

An opportunity of trying the effect of giving **Human Milk from a Thyroidectomized Woman** in the treatment of Graves's disease presented itself to Pychlau,[5] and the result is interesting. The Graves's disease patient was a typical case, getting worse in spite of ordinary treatment; her sister had had Graves's disease, but had been cured by partial thyroidectomy. This sister became pregnant, and, when the child was born, Pychlau obtained 200 c.c. of milk from her each day by means of the breast pump, and administered this to her sister, who had not been operated upon. The treatment was continued for four months, and—whether *post hoc* or *propter hoc* is difficult to say—the symptoms became very greatly ameliorated. So far as it goes, the result supports the belief of those who hold that the milk of thyroidectomized goats is likely to be beneficial to patients suffering from exophthalmic goitre, though the improvement that resulted may have been purely a coincidence, for the sister had been only partially thyroidectomized.

Iodine given by mouth said to be valuable in exophthalmic goitre

(*p.* 18); **Testi-Iodyl** spoken well of as a vehicle of iodine (*p.* 34); **Radium** (*pp.* 66 *and* 69).

References.—[1]*Amer. Jour. Med. Sci.* 1913, ii, 790; [2]*Ibid.* 781; [3]*Brit. Med. Jour.* 1914, ii, 106; [4]*Johns Hop. Hosp. Bull.* 1914, 223; [5]*Deut. med. Woch.* 1913, 2299.

GONORRHŒA. *C. F. Marshall, M.D., F.R.C.S.*

Diagnosis.—Thomas, Ivy, and Birdsall[1] give their experience of the *complement-fixation test* for gonorrhœa. They draw attention to the necessity of standardizing all reagents used, especially owing to the instability of the watery extraction of gonococci from cultures used as antigen. The antigen must be polyvalent, owing to variation in different strains of gonococci. It is made from forty-eight-hour cultures on blood-agar, then suspended in sterile distilled water, autolyzed for twenty-four hours at 37° C., and heated for half an hour at 60° C. in a water-bath. It is then diluted to 10 per cent with normal saline. The authors have compared the results with those obtained from non-specific antigens made from other bacteria (*Micrococcus catarrhalis, Diplococcus meningitidis, Streptococcus pyogenes*, etc.). These occasionally gave a positive reaction with serum from a patient with gonorrhœa, but the authors explain this by mixed infection. *M. catarrhalis* gave a weak positive reaction in about 10 per cent of cases. With the gonococcus antigen a positive reaction was not obtained till the sixth week of the disease, and not at all when the affection was limited to the anterior urethra or vagina. The reaction is regarded as more specific than the Wassermann test for syphilis, because it does not occur in any other disease and is not influenced by drugs. A positive reaction was obtained in 21 per cent of cases clinically cured. The reaction was positive in the majority of cases of posterior urethritis, prostatitis, and seminal vesiculitis, and also in cases of stricture. It was positive in all cases of epididymitis and arthritis after the fifth week. The authors conclude that the gonococcus reaction is useful in the differential diagnosis of pelvic disorders in women, and in cases of arthritis.

Treatment.—Youman[2] considers that the old division of the urethra into anterior and posterior portions should be replaced by one based on histological differences. According to this view, the fossa navicularis, lined with stratified epithelium, is regarded as the anterior, and the remainder, lined by cylindrical epithelium, as the posterior portion. The incubation of the gonococci takes place on the surface of the stratified epithelium of the fossa navicularis, and while they are limited to this region the discharge is mucoid. If not aborted at this stage the gonococci spread backwards to the posterior urethra and its annexes, and penetrate the cylindrical epithelium to reach the sub-epithelial tissue. As soon as the infection has passed beyond the fossa navicularis the discharge becomes purulent, owing to leucocytosis. After having invaded the cylindrical epithelium and the sub-epithelial tissue, the gonococci rapidly proliferate, and provoke intense inflammation. If the active phagocytosis provoked by their toxins

persists long enough, the gonococci are completely destroyed; but if it is arrested by a barrier of hyperplastic connective tissue, chronic gonorrhœa or gleet results, and the discharge is transformed from purulent to muco-serous. When the infection has spread to the pubo-penile angle the discharge is divided into two portions, the anterior being evacuated by the meatus, the posterior entering the bladder. During the conflict between the phagocytes and the gonococci a great number of the former die in the crypts and follicles of the urethra, while many gonococci are discharged into the urethra. Nature attempts to get rid of the dead phagocytes as well as the gonococci by secreting serum. Treatment should therefore be directed towards the assistance of nature in removing pus and gonococci by frequent irrigations containing an oxidizing agent, and by keeping the urethra as clean as possible by day and by night.

For this purpose the author commences with irrigations every six hours, increased in frequency to every two hours, night and day. He considers treatment at night especially important. The quantity of fluid for irrigation should be 4 to 8 litres, and the temperature 35° to 40° C. Hot water produces thermotaxis of leucocytes. The best drug for irrigation is **Permanganate of Potassium.** Phagocytosis is nature's means of curing gonorrhœa, and the phagocytes can remove gonococci from situations which cannot be reached by medicinal or mechanical treatment. When phagocytosis fails it must be re-established by artificial chemotaxis. As the gonococci disappear, the chemotactic substance which they elaborate disappears also, so that the strength of the artificial chemotactic agent used must be gradually increased, to make up for the loss of that produced by the gonococci. Artificial chemotactic agents include permanganate of potassium, nitrate of silver, and **Silver Salts** such as protargol, argyrol, etc., and sulphate of zinc. **The Balsams**—copaiba, santal, and cubebs—are chemotactic, owing to their irritative action on the mucous membrane of the urethra. The new silver salts are less chemotactic than the nitrate. Whether they have any action on the gonococcus is of less importance, because the destructive agent is the phagocyte, and these drugs act by stimulating phagocytosis. According to the author, this explains the action of sulphate of zinc. The primary action of these medicaments is therefore chemotactic, and any destructive action on the gonococcus is secondary.

The chemotactic drugs are not always capable alone of arresting the disease, and should be associated with irrigations containing an oxidizing agent. This combination harmonizes with the forces of nature. When the affection is limited to the anterior urethra (the fossa navicularis) this part only is treated, by occluding the urethra beyond by finger and thumb. When the discharge is yellow, indicating that the posterior urethra is affected, the whole urethra should be treated. The author considers the two-glass test useless. If prostatitis occurs, irrigation should not be stopped for fear of causing epididymitis, because, according to the author, the gonococci have already reached the vas deferens. The only means of arresting their progress consists

in irrigations with oxidizing agents and chemotactic substances. Irrigation by hydrostatic pressure (Janet's method) is preferable to irrigation with a syringe. The author emphasizes the necessity of general treatment of the patient as well as local treatment of the gonorrhœa.

Wyndham Powell[3] recommends irrigation in the treatment of acute gonorrhœa in the male. The single nozzle is preferable to the two-way nozzle. The anterior urethra should be flushed with sufficient pressure to cause " ballooning " of the urethra. For this purpose a pressure of six feet is necessary. Immediately after ballooning, the nozzle should be removed to empty the urethra. By this means the fluid is enabled to enter the ducts of Littré's glands. In the early stage, when the disease is limited to the first two or three inches of the urethra, the whole anterior urethra should be irrigated with full pressure. According to Powell, healthy mucous membrane treated with potassium permanganate irrigations offers a barrier to the spread of gonorrhœa. He considers **Potassium Permanganate** as almost specific. Silver nitrate, by lowering the vitality of the mucous membrane, favours rather than retards the spread of infection in acute cases. Ordinary syringes are inferior to irrigation. The permanganate solution may be used in strengths of 1–5000 to 1–2000, the temperature should be 98° to 100° F., and the quantity five or six pints. For the first three or four days irrigations should be performed morning and evening with a 1–3000 solution ; then once a day with 1–2000. In very acute cases a 1–5000 solution may be used, after injection of 20 drops of a 2 per cent solution of cocaine, retained for two or three minutes. If the discharge persists after this treatment, it shows that the lacunæ of Morgagni or glands of Littré are involved, owing to treatment not being commenced early enough. For these conditions the gentle use of Kollman's irrigating dilator is advised, once or twice a week. The solution used for this is **Oxycyanide of Mercury,** 1–4000. If further treatment is required, the author recommends urethroscopy.

Osborn[4] recommends the following combined treatment : Irrigations of **Permanganate** and **Protargol** during the first ten days, followed by two or more subcutaneous injections of gonococcal **Vaccine** in doses of 200 millions. After this, irrigations with mixed **Sulphates of Iron, Copper, Aluminium, and Zinc,** or, in rebellious cases, with solution of **Iodine.** The results are said to be good, the period of treatment being shortened, and relapses being absent. **Methylene Blue** and **Hexamine** (*urotropine*) are also given internally. The author thinks that vaccine treatment is more efficacious immediately after the acute stage.

Virghi[5] recommends **Electrolytic** treatment for the abortive cure of gonorrhœa. This method is as follows : The patient having urinated, the anterior urethra is washed out with sterile water ; then 5 c.c. of a 2 per cent solution of cocaine are injected and retained for a few minutes. This solution is then expressed, and 5 c.c. **Protargol** solution injected and retained. The negative electrode, consisting of a flexible, olive-headed metal bougie with insulated surface, is passed into the

urethra containing the protargol solution. The bougie is moved about so that its head comes in contact with the whole anterior urethra. The positive pole is placed on the body and the current regulated short of producing smarting. The treatment lasts three or four minutes, and is repeated in twenty-four hours. After this the urethra is irrigated with boric solution, followed every two or three days by massage on a straight sound, and endoscopic application of protargol or silver nitrate solution to the fossa navicularis. If the gonococcus reappears in the secretion, the electrolytic treatment is repeated. The author has treated 92 cases and claims 100 per cent of cures. The duration of treatment varies with the age of the infection. In 57 cases where the duration was from one to three days, a cure was obtained in about eight days. He thinks that this method may be successful up to the eleventh day after infection.

Cruveilhier[6] reports successful results from the use of **Sensitized Vaccines** (Besredka's method) in gonorrhœa and its complications. In cases of epididymitis, the pain subsided within twenty-four hours after the first injection, and the redness and tension from five to eight days after two or three injections. The latter were made at intervals of forty-eight hours. Good results were also obtained in cases of metritis and salpingitis. In metro-salpingitis with effusion into the tubes the swelling disappeared in two or three weeks. In one case of nine years' standing the painful symptoms and discharge disappeared after this treatment. In cases of gonorrhœal arthritis the pain and swelling disappeared after five or six injections. Cases of chronic "rheumatism," in patients who had formerly suffered from gonorrhœa, were also benefited. Good results were obtained in cases of acute and chronic urethritis. In acute urethritis the pain and inflammation subsided after the second injection, and the discharge usually ceased in about four weeks. The effect in chronic urethritis was also favourable. The author concludes that living is better than dead sensitized virus for injection, and that the former often succeeds where the latter fails. The serum employed was taken from a goat injected with Besredka's vaccine. The gonococci used for this purpose were taken from stock cultures.

Nicolle and Blaizot claim to have produced a gonococcal **Vaccine** which is stable and non-toxic, while vaccines prepared in other ways are, in their opinion, uncertain in their action owing to the crude methods of sterilization, and their toxicity, which is not avoided even by Besredka's method of sensitization. Vaccines prepared in the usual way are said to be coagulated by heat, and to be unstable owing to consequent autolysis. These changes are said to be prevented by the use of sodium fluoride solution, which kills the gonococci but does not alter them by coagulation. It is also said to diminish toxicity; but this effect is chiefly obtained by growing on a special culture medium, consisting of broth 100, urea 0·4, glucose 2, phosphate of ammonium 0·5, agar 1·5. To 5 c.c. of this mixture is added 0·5 c.c. of rabbit's serum. By a series of subcultures with gradually

reduced proportion of rabbit's serum the gonococcus is trained to grow on the medium alone. A twenty-four-hour culture is then scraped off, washed, and centrifuged. Nicolle and Blaizot describe another organism frequently associated with the gonococcus, which they call the 'Synococcus,' closely resembling the gonococcus, but easily cultivated on serum-free media and Gram-positive. They suggest that it is related to the gonococcus, and that it has the same curative effect in vaccines. The vaccine prepared by these observers is said to contain nine parts of 'synococci' to one of gonococci. A dose of 0·5 c.c. contains 25 million gonococci and 225 million 'synococci.' This is diluted with 1·5 c.c. saline solution, and injected into the muscles. The authors report remarkably good results in 200 cases, including acute and chronic urethritis, orchitis, gonorrhœal rheumatism, and ophthalmia. They recommend injection every two days for seven or eight injections, in acute urethritis, combined with local treatment, and injection every three or four days in chronic urethritis, and every day in gonorrhœal ophthalmia. (*See also p.* 36.)

Donaldson has tried this vaccine in four cases—two of chronic urethritis in the male, and two of vaginal discharge in the female. The treatment had little or no effect on the discharge and none on the gonococci. Evidently, further experience is required with this vaccine before its value can be determined.[7]

Debré and Paraf[8] report their experience with **Antigonococcic Serum.** They point out that the failure of former attempts at serum therapy in gonorrhœa is due to the fact that the gonococcus, like the meningococcus, does not act by a diffusible toxin, but the lesions produced are due to the action of the microbe itself by liberating endotoxins. It is therefore necessary to make an antimicrobial serum, the action and mode of application of which are essentially different from the action and application of an antitoxic serum, such as antidiphtheritic serum. Experience with **Antimeningococcic** serum has shown the necessity of injecting into the spinal canal, i.e., at the seat of multiplication of the microbes, and at the onset of infection; also that the serum should be polyvalent and given in strong doses. Applying these principles to the treatment of gonorrhœa, the authors mention three essential conditions: (1) To obtain an active polyvalent serum and immunize an animal with it; (2) To produce in the animal an experimental gonococcal infection with a constant evolution which allows regulation of the active power of the serum, and only to use this when its power has been proved on animals; (3) To apply this serum to the different localizations of the gonococcus. The two first conditions were realized by alternate subcutaneous and intravenous injections of both living and autolyzed gonococci, in increasing doses and of different strains. The activity of the serum *in vitro* was measured by means of complement fixation. But the true method of titration of a serum is its anti-infective power *in vivo*. For this purpose the authors injected a culture of gonococci into the eye of the rabbit, causing purulent panophthalmia. This was cured by intra-ocular

injections of the antigonococcic serum, but antimeningococcic serum had no effect. Purulent meningitis was also produced in monkeys by intrathecal injections of cultures of gonococci, and this also yielded to antigonococcic serum. These experiments prove the value of antigonococcic serum prepared according to the first two conditions. The third condition, the mode of application to the localization of the gonococcus, remains to be proved. The authors already report good results by urethral injections of the serum in two cases of acute gonorrhœa.

Corbus[9] has also tried antigonococcic serum in twenty-four cases of gonorrhœa, including acute and chronic urethritis, epididymitis, arthritis, endometritis, and salpingitis. The results in most cases are said to be favourable. The serum used was apparently the same as that instituted by Rogers and Torrey, prepared by injecting rams with gonococci. The author considers that the complement-fixation test is a reliable guide in the administration of the serum. When it is negative the serum should not be used. The efficiency of the serum is in direct proportion to the intensity of the positive reaction. A negative reaction after two or three months indicates a cure. The amount of serum should be from 36 to 45 c.c., given intramuscularly, from 12 to 15 c.c. daily for three days.

Harrison[10] reports his experience with the treatment of gonorrhœa by **Phylacogen**. This is a trade name for solutions of bacterial products introduced by Schafer. The use of phylacogens is based on the theory that every bacterial disease is due to mixed infection, in which the pathogenic organism predominates, but is associated with other organisms commonly found in the body. Hence phylacogens are intended to attack, not only the pathogenic microbe, but also the secondary ones. Basic phylacogen is prepared by mixing filtrates of cultures of all the commoner pathogenic organisms. This constitutes " mixed-infection phylacogen," and is mixed with the filtrate of a pure culture of the micro-organism of the disease to be treated. Phylacogens thus differ from " vaccines " in the absence of actual bacteria, and resemble more the toxins used in the manufacture of antitoxins. They may be administered by subcutaneous, intramuscular, or intravenous injection. The dose recommended for subcutaneous injections is 1 to 2 c.c. for the first dose, which is doubled each time up to 10 c.c. For intravenous injection 0·125 c.c. to 0·25 c.c., increased up to 5 c.c. The injections are made at intervals of one to two hours, according to the degree of reaction, and are continued for ten days after the disappearance of symptoms. The reaction consists of local pain, rise of temperature, and chilliness. It is more severe after intravenous injection. Harrison has treated ten cases of epididymitis, some with urethritis, and one case of arthritis. In the case of gonorrhœal arthritis, pain was relieved and recovery apparently hastened, but in the cases of epididymitis and urethritis no definite effect was produced.

Wilson[11] recommends **Bier's method** in *acute and chronic epididymitis*, and says that the duration of the disease is shortened by one half by

this method. A strip of lint is passed round the cord just above the testicle, and is continued between the two testicles along the median raphe of the scrotum. A piece of rubber tubing is applied over the lint, tightened to the necessary degree and secured by artery forceps. The constriction should stop short of pain. Treatment is applied for an hour on the first day and increased daily up to eight hours. In very acute cases half an hour may be enough at first.

GONORRHŒAL VULVO-VAGINITIS IN CHILDREN.

E. Rogers Spaulding[12] has investigated a number of cases of vulvo-vaginitis at the Boston Children's Hospital. She points out that the great majority are of gonorrhœal origin ; that the disease may last a long time with periods of latency ; that it may be followed by grave complications ; that the best treatment is often unsatisfactory ; that prophylaxis is important, both at home and in hospital. Out of 84 cases observed, 56 were gonococcal, 9 non-gonococcal, and 19 uncertain. The average age was about five years, the lowest seven months, and the highest eleven years. Relapses were frequent, apart from reinfection, and occurred sometimes after a year's interval. The average duration of the disease in twenty-six cases which were followed up was twenty months. The complications included proctitis, cystitis, arthritis, pelvic peritonitis, inguinal, vulvar, and ischiorectal abscesses, and urethritis. Treatment was carried out by local applications combined with vaccine therapy. Local treatment consisted in vaginal irrigations with hot **Boric Solution** three times a day, performed by means of a soft catheter, followed by instillation of 25 per cent **Argyrol. Vaccines** were given once or twice a week, commencing with 50 million, and increasing by 25 million up to 400 million gonococci. The average duration of vaccine treatment was three months, with a maximum of eight months. The results were better with combined local and vaccine treatment than with vaccines alone. Vaccines, therefore, do not appear to have been very efficacious.

Comby[13] has observed 152 cases, varying in age from three weeks to fifteen years, but only two cases under two years of age. He regards over-crowding among the poorer classes as one of the chief causes. Contagion was usually accidental, rarely venereal. He remarks that many women have vaginal discharges which are contagious for children, but not to their husbands. After this, contagion takes place from one child to another, directly or indirectly. Acute contagious vulvo-vaginitis must be distinguished from aphthous and impetiginous vulvitis, from anæmic leucorrhœa, and from traumatic or irritative vulvitis (onanism, oxyuris, etc.). All these are non-specific and easily curable. Acute contagious vulvo-vaginitis is usually gonococcal. As regards complications, Comby states that gonococcal peritonitis in little girls is not grave, and mentions eight cases which recovered without operation. However, Eppstein and others have reported cases which were fatal, with or without laparotomy. Other observers have reported purulent salpingitis, and some think that vulvo-vaginitis

may lead to malformations of the uterus, dysmenorrhœa, and even sterility, and that some cases of suppurative salpingitis of doubtful origin in virgins may be due to gonorrhœal infection in infancy. As regards treatment, Comby had favourable results with **Vaccines,** the vaginal discharge having ceased in ten cases after two to four injections made every three or four days.

Gilbert Smith[14] has applied the complement-fixation test for gonorrhœa to cases of vulvo-vaginitis, and concludes from this evidence that the majority of cases can be cured by proper treatment. A negative reaction indicates a cure, but a weak positive reaction does not indicate that the disease is still present, because it may be due to a " group reaction," in which the gonococcus antigen combines with antibodies of allied micrococci. For local treatment the author recommends irrigation with warm solutions of **Boric Acid, Sodium Bicarbonate,** or **Permanganate of Potassium** (1–8000 to 1–6000), followed by injection of about half a drachm of 10 to 20 per cent **Argyrol** or 5 per cent **Protargol** twice daily. In chronic cases, irrigation of 1–1000 **Silver Nitrate** and the application of **Weak Tincture of Iodine** (*tinct. iodi*, B.P. 1898) to the cervix through an endoscope tube is advised. Urethritis may be treated with instillations of 5 per cent argyrol. Smith regards vaccines as of little use in gonorrhœa of mucous membranes. Local treatment should be continued for a month after symptoms, and the cases should be kept under observation for another three months.

Schwers[15] reports a case of gonococcal septicæmia in a child of two years with vulvo-vaginitis. The complications in this case were successively tenosynovitis of the extensors of both forearms, arthritis of the vertebral column, and arthritis of the sternoclavicular joint. The case recovered under treatment by immobilization. The author considers that articular and tendinous complications of gonorrhœa have a natural tendency to cure, and that cases said to be cured by antigonococcic serum must be accepted with reserve.

References.—[1]*Surg. Gyn. and Obst.* 1914, i, 390; [2]*Urol. and Cutan. Rev.* 1913, Oct.; [3]*Brit. Med. Jour.* 1914, ii, 529; [4]*Jour. R.A.M.C.* 1913, 585; [5]*Med. Rec.* 1914, i, 1168; [6]*Lancet*, 1913, ii, 1311; [7]*Brit. Med. Jour.* 1914, ii, 826; [8]*Presse Méd.* 1913, 1013; [9]*Jour. Amer. Med. Assoc.* 1914, i, 1462; [10]*Lancet*, 1913, ii, 1375; [11]*Brit. Med. Jour.* 1913, ii, 1281; [12]*Amer. Jour. Dis. Child*, 1913, March; [13]*Arch. de Méd. des Enf.* 1914, 209; [14]*Amer. Jour. Dis. Child.* 1914, 230; [15]*Arch. de Méd. des Enf.* 1914, 355.

GOUT. *Herbert French, M.D., F.R.C.P.*

Lampe[1] speaks favourably of the use of **Acitrin-Colchicin** in the treatment of chronic gout. Acitrin is a phenyl-cinchonin-acid-ethyl-ester, and the combination used in his clinic consisted of 0·5 gram acitrin with 0·0003 gram colchicin. He found that it had no deleterious effects of any kind, but increased the amount of uric acid excreted in the urine to a remarkable extent. He does not give details as to dosage, and the basis of his view that the drug does good to gouty individuals appears to be the increased amount of uric acid in the urine after its administration. [We do not consider this by

itself to be a good criterion, for no one really knows what is the relationship of the amount of uric acid in the urine to gout, and there seems to be no real ground for supposing that a drug which causes the urine to contain more uric acid will necessarily be beneficial to a gouty patient.—H. F.]

Howard speaks highly of external application of **Potato Juice** (*p.* 28).

REFERENCE.—[1]*Berl. klin. Woch.* 1914, 933.

GRAFTING, TISSUE AND ORGAN TRANSPLANTATION. (*See also* ARTERIES, SURGERY OF; BONES, DISEASES OF; JOINTS, SURGERY OF.) *F. W. Goyder, F.R.C.S.*

The Technique of Thiersch Grafts.—Hardouin[1] insists that in order to get successful results by this method it is essential to remove all the granulations completely with the curette, to obtain perfect hæmostasis by pressure, to transfer the grafts directly from the razor to the prepared surface without handling, and finally to cover with a single layer of sterilized gauze and a cotton-wool dressing. The first dressing should be done six or seven days after operation. Careful separation of the dressing up to the edges of the wound is done; if necessary, the wool may be soaked for an hour or two with boiled water. The dressing then comes away easily without injury to the grafts. The original dressings are applied dry, and no protective is employed.

Transplantation of Tissues.—The strides which have recently been made in this method are fully reviewed by Lexer.[2] The use of free flaps as opposed to pedunculated ones is now a well-established and usually a successful procedure. With epidermis as with most tissues, autogenous grafts are the most successful. Lexer doubts if homoplasty is successful in any instance with skin. When using the whole thickness of the skin, it matters little whether the fat is removed or not. Mucous membrane grafts are uncertain in their results owing to the likelihood of infection. As to free fat grafts, with which Lexer's name is chiefly associated, the technique needs to be very exact, special stress being laid on careful handling of the graft, perfect hæmostasis, and keeping the suture line well away from the transplant. Fat is of use in padding regions such as the breast and face, for interposition in the mobilization of joints, for the protection and isolation of nerves and tendons, and particularly for filling dural and cranial gaps in cerebral surgery. Transplanted muscle and nerve degenerate; muscle is of use to keep bony surfaces apart, while segments of vein are more useful and available for bridging a severed nerve. Vascular surgery has reached a high level of excellence; autoplastic transplantation of arteries is not feasible, and homoplastic arteries degenerate, but the saphenous vein is nearly always available and serviceable. Tendon grafts are successful, but early passive movement is essential to get a strong tendon without adhesions; tendons make useful ligaments. Where tendons have sloughed from thecal inflammation, they may be replaced by removing the palmaris longus or the extensor tendons of the toes. To prevent adhesions, long skin incisions should

be avoided ; the method of small punctures and tunnelling should be employed. If the theca is also destroyed, its place may be taken by the wearing of rings or by transverse bridges of skin at the flexures of the joints. The use of fascia is too well known to need description. Periosteum has similar uses, and homo- as well as auto-plastic transference is possible. Bone transplantation is almost a commonplace (*see under* BONE). Cartilage is useful for nasal restoration ; it is doubtful whether it persists as such, but in joint-transplantation it appears to functionate well. As is well known, Lexer has had considerable success in the latter procedure at the knee, but the operation is unlikely to come into general use (*see also* JOINTS). In certain cases of transplantation, the tissue retains its original histological characters, in others it is replaced by tissue of the same kind growing in from without ; this usually takes place in bone. Most frequently, perhaps, the transplant is replaced by tissue of a different kind, but the result may still be a clinical success, as the joint remains mobile, the filled-up hollow remains as such, or the new ligament does its work. In the case of organs, however, the special cells usually degenerate soon or late, and the internal secretion lasts only till the tissue is absorbed.

Transplantation of Organs. — Ullman[3] goes more fully into this subject. He also refers to blood-vessel transplantation. He notes that in animals heterotransplantation of arteries has been successful ; in man the arteries have to be replaced by vein. The heart with the lungs has been successfully engrafted, and functionated for two days, in the dog. With the thyroid, in animals, autoplastic transplantation has succeeded, but not homoplastic ; in man, the function persists till the tissue is absorbed. The parathyroids have at times been successfully grafted into the same and similar animals ; it has been unsuccessful in man. The adrenals have been transplanted in animals ; in man the adrenal of a pig was found degenerated fourteen days after implantation. The ovaries have frequently been transplanted in animals with permanent success, and with occasional success in the human race. Small portions appear to be sufficient. Testicles transplanted in animals may retain spermatozoa for months. Ovaries exchanged for testicles in certain immature animals have resulted in the development of female characters. Since the advent of blood-vessel surgery, the kidney has been transplanted with success in animals. In a girl with hæmorrhagic nephritis, an implanted ape's kidney lived for thirty-two hours ; the patient survived thirty-two days. In animals, the spleen has been extirpated and reimplanted successfully. The pancreas has been transplanted with a vascular pedicle, afterwards divided. The stomach and intestines have been used repeatedly with success ; small pieces can be put in without pedicle in animals. The prostate has been implanted subcutaneously ; hypertrophy of the connective tissue and degeneration of the glands took place. Partial transplantation of the hypophysis in animals has met with temporary success but ultimate degeneration.

He concludes: "The hopes which were entertained fifteen years ago regarding tissue and autotransplantation have been partially fulfilled; in heteroplastic transplantation it appears that the obstacle to success lies in anaphylaxis, while in homoplasty, inherent biochemical characteristics interfere with healing. On this ground only can be explained the unsuccessful results of these types of transplantation as compared with the more favourable and more permanent results in autotransplantations. In heterotransplantation, relatively successful results have been obtained in the case of bone, as it is finally replaced by the bone of the recipient. (*See also* BONE.) The cell protoplasm, specific for each organism, varies with the individual. There are as many protoplasms as there are individuals. Thus, in homotransplantation, the appearance in the body of a foreign protoplasm calls ferments into the circulation which destroy the transplanted tissue. The statement of Roux which he made in 1895, that a part of an organism will accustom itself to the surroundings in another organism cannot in this day be accepted. Whether it is possible or not artificially to alter the bloods of two individuals so that homotransplantation will be successful is questionable. For this purpose one could resort to parabiosis.

Lespinasse[4] describes a case in which grafting of testicular tissue in a man who had lost both testes was successful in restoring sexual powers both as regards desire and ability. The power of erection, which had been lost, returned, and was maintained for the two years he was under observation. The scrotum was opened high up and a bed prepared as for undescended testicle. Hæmostasis was carried out with great care. Another incision was made over the rectus abdominis muscle; its fibres were separated by opening an artery forceps plunged into it. Hæmostasis was carried out, and a testicle removed from a healthy adult. It was immediately stripped of the epididymis, cord, and tunica vaginalis, and then sliced transversely to its long axis, these slices being approximately 1 mm. in thickness. The central slice and the one next to it were placed among the fibres of the rectus muscle. Another slice was placed in the scrotum. The wounds were closed without drainage. Erection and desire first took place on the fourth day after operation.

REFERENCES.—[1]*Presse Méd.* 1913, 687; [2]*Ann. Surg.* 1914, ii, 166; [3]*Ibid.* 195; [4]*Jour. Amer. Med. Assoc.* 1913, Nov, 1869.

GRANULOMA ANNULARE. *E. Graham Little, M.D., F.R.C.P.*

Hartzell[1] reports five new cases of this rare disease, and remarks on the etiology. Four of the five cases occurred in women, and in four cases the distribution was the usual one on the back of the hands and the neck. In the fifth case the clinical appearances were rather those of erythema elevatum dilutinum of Crocker; but the histological picture was so obviously the same as in the other four cases, that the identification of the two conditions which was suggested by Graham Little and by others some years ago, was well confirmed. In all the cases there was a long history of persistence before treatment was applied. This consisted in some instances in **Excision.** In the greater

number of instances **X Rays** were tried with benefit, and a paste containing **Pyrogallol** was also effective. In the subsequent discussion of this paper, Sutton reported success with freezing by **Carbon Dioxide** after *x* rays had failed to affect the eruption, and the writer can confirm this statement from his own experience. Hartzell believes the disease to be *sui generis*, with no connections with tuberculosis or sarcoid, and he regards the causation as completely obscure at present.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 230.

GUNSHOT INJURIES. (*See also* ARTERIES; *and special section*, NAVAL AND MILITARY SURGERY). *F. W. Goyder, F.R.C.S.*

Yoosuf,[1] who was on the Turkish side in the Balkan War, says: "In this war 80 per cent of wounds were due to shrapnel, the effects being most deadly at 10 to 30 metres. At 100 to 300 metres a turban is sufficient protection against injury to the head. As the distance increases there is less injury to soft tissues than to bones, while at 1200 metres the lesions are contusive fractures with great displacement. In the Russo-Japanese War 36,000 soldiers, each wounded four times by bullets, recovered in a short time and were sent to the front again; in the Balkan War from 45 to 66 per cent of wounded returned to the front. Immediate death on the battlefield is less frequent than formerly; in 1870, 1 out of 5·8 men died on the battlefield, while in the Balkan War this was reduced to 1 out of 43. Secondary mortality has been reduced from 21 to 3 per cent. The destructive power of French shrapnel is much greater than German." He concludes:—

1. Both in theory and practice, surgery in war is similar to emergency practice in ordinary life.
2. The surgeon must take the same precautions against infection.
3. The fate of the wounded depends more or less on the men applying first aid.
4. A surgeon must not attempt to disinfect a wound on the battlefield.
5. In emergency, operations must be performed at the field hospitals.
6. No probing for bullets must be done on the battlefield.
7. Tourniquets for hæmorrhage must not be left on for more than four to six hours, as there is danger of gangrene.
8. The *x* ray is the most valuable diagnostic agent in war.
9. Gunshot wounds of extremities demand conservative surgery.
10. Penetrating gunshot wounds of the skull indicate operative interference.
11. Gunshot wounds of the chest demand strict antisepsis.
12. Cœliotomy is indicated in penetrating gunshot wounds of the abdomen.

Laurent[2] on the Bulgarian side also describes the general effects of projectiles in this war. His results agree closely with those stated above. He criticizes the policy of leaving abdominal perforations alone, and thinks that many more wounded could be saved by prompt

laparotomy, especially in cases of hæmorrhage and vascular wounds. For this purpose special ambulances should be reserved. Wounds of the skull are responsible for half the deaths, and early intervention is advisable, especially in depressed fractures. A large proportion of the surgeons employed should be experienced in operative work, especially in the treatment of fractures. Of the deaths, 55 per cent were due to head injuries, 35 to 40 per cent to injuries of the trunk, and 5 per cent to the limbs. Gunshot injuries were responsible for 82 to 84 per cent, and shrapnel for 15 to 17 per cent. Seventy-five per cent of wounded recovered without complication. There were a large number of cases of concussion with subsequent psychoses.

Injuries to nerves[3] were more frequent than aneurysms (q.v.). Incomplete section was frequent, complete section being usually the result of comminuted fracture. Delorme states that the results of operation are less favourable, and the prospects of spontaneous repair are more favourable, than in civil practice. The musculospiral nerve, especially of the left arm, is most frequently injured. Primary suture being generally impossible, operation should be performed when all inflammatory signs have disappeared, unless of course it can be done at the same time that an injured artery is dealt with. Spontaneous recovery of a nerve wounded by a bullet, Laurent regards as quite exceptional.

References.—[1]*N.Y. Med. Jour.* 1914, i, 128; [2]*Presse Méd.* 1913, 989; [3]*Rev. de Chir.* 1914, i, 553.

HÆMORRHAGES.

For controlling and preventing excessive bleeding during and after operations, and also after the various types of non-traumatic hæmorrhage, **Coagulène** is claimed to be valuable (*p.* 7).

HÆMORRHAGIC DISEASE OF THE NEW-BORN.

Frederick Langmead, M.D., F.R.C.P.

Etiology.—Hæmorrhages in the new-born may occur under various conditions. They may be spurious, as when blood is swallowed from the mouth, nose, or pharynx following an injury at birth, or from the nipple of the mother's breast; symptomatic, as part of sepsis, severe jaundice, epidemic hæmoglobinuria, or Bühl's disease; or they may denote the presence of that unexplained condition known as 'morbus maculosus neonatorum,' 'melæna neonatorum,' or 'the hæmorrhagic disease.'

W. J. H. Pinniger[1] sees no reason to place 'hæmorrhagia syphilitica neonatorum' in a separate category, as some have done, but regards it merely as denoting the occurrence of syphilis in a patient suffering from the hæmorrhagic disease. Syphilis has been found so seldom, either in the child or in the parents, that one ought not, he thinks, to look upon hæmorrhages in the new-born as syphilitic. Definite lesions, notably ulcers in the duodenum, have been described in a few cases, but as the accounts of them are meagre, and other hæmorrhages have been seen after death in the same patients, it is possible that these cases, too are examples of the same disease. Hæmophilia probably

plays little or no part in the etiology of this peculiar bleeding of young infants; as Pinniger states, the affection is a temporary phenomenon, and if recovery follows, the patients are not 'bleeders' in later life; females are affected as often as males; there is no family history of hæmophilia; and hæmophilia is extremely rare in the first year of life.

TREATMENT.—The 'hæmorrhagic disease' is now ascribed by most authorities to a want of coagulability of the blood, due to the absence of one or more of the agents by which coagulation is brought about. The more recent methods of treatment are founded on this conjecture, and their success is the best argument in its favour. These methods are chiefly two: (1) Direct transfusion of blood; and (2) Subcutaneous injection of human blood-serum.

V. D. Lespinasse[2] says that **Transfusion** stops the bleeding at once, replaces the blood lost, and gives the baby fresh complement and antibodies to aid it to overcome any infection that may be present. In his opinion this method of treatment will bring about recovery in practically every case. During the progress of the transfusion the child's colour gradually becomes pink, then red, first on the lips and the ears, then small pink spots are noticed scattered diffusely over the body, and finally the baby may become as red as an ordinary scarlet fever patient. The hæmorrhage from the various lesions ceases abruptly. Simultaneously with the colour-changes in the skin, there is a great improvement in the baby's general condition. Afterwards it takes the breast and sleeps quietly, the restlessness is gone, the temperature drops to normal, the old blood is passed out of the intestine in a day or two, and the baby gains in weight as fast as a normal one. He records 14 cases which he has treated in this way. No deaths occurred from hæmorrhage. Two patients died from syphilis, one five days and the other nine days after transfusion. The father supplied the blood in 10 cases, the mother's half-sister in 1, whilst the donor was not related to the baby in the other 3. The blood was obtained from the radial artery in 7 cases and from the veins of the forearm in the other 7. It was transfused into the femoral vein of the baby in 4 instances (*Fig.* 52) and into the jugular

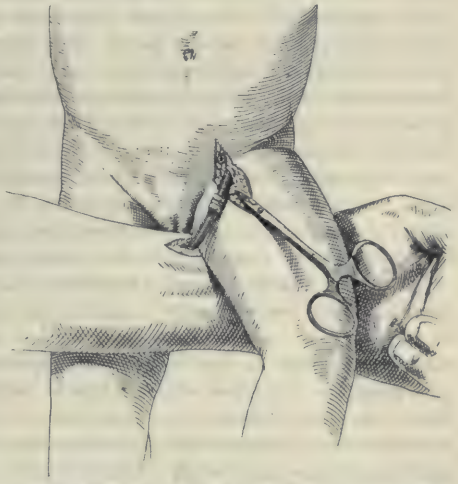


Fig. 52.—Position of baby and the donor's arm in direct transfusion from the radial artery of the donor to the femoral vein of the baby, done according to Crile's method.

in 10. The duration of the operation varied from five to fifteen minutes. He quotes from medical literature tewnty-three cases of patients who have been treated by the same method, all of whom recovered except one, who died from syphilis.

Treatment by the **Subcutaneous Injection of Blood-Serum** has also given very satisfactory results ; indeed one author, J. E. Welch, has recorded 35 successful cases in his own practice.

Schloss and Commiskey advocate the injection of **Whole Human Blood** ; they have reported 9 cases, in 7 of which recovery took place. To these H. G. Jarvis[3] adds 13 more. The method has the advantage of simplicity, the only apparatus needed being a syringe and needle and a piece of strong flexible rubber, and the last of these is not indispensable. The syringe should hold 10 c.c., or preferably 20 c.c., of fluid ; one made of glass is best, because the blood is less likely to clot in it. The needle which has given the best results is a medium-sized aspirating needle. The rubber tube joins the needle to the syringe and allows free play between them. The blood is drawn from the basilic vein, preferably from the father, and then injected into the infant's buttocks or back. The amount used is from 10 to 20 c.c., and should be repeated in four to six hours if the hæmorrhage has been severe or recurs. Of the 13 cases treated by Jarvis, 3 died. The number of cases hitherto recorded as treated by this method is 24 ; 5 of these died, the mortality, therefore, being 21 per cent. The advantages which Jarvis claims for this procedure are its simplicity, its efficacy, and its freedom from danger to either recipient or donor.

A new substance named **Coagulose** has been used. It is a sterile, soluble, anhydrous powder containing fibrin ferment. The contents of one bulb are added to 6 or 8 c.c. of sterile water and vigorously shaken until all is dissolved. The injection is made subcutaneously, and may be repeated several times until the bleeding stops. It is stated to have produced no untoward symptoms. P. J. Collander[4] records a case in which the bleeding stopped after the third injection, and the patient recovered. The case, however, is not very convincing, as one injection of human blood-serum had been administered previously.

REFERENCES.—[1]*Bristol Med.-Chir. Jour.* 1913, 248 ; [2]*Jour. Amer. Med. Assoc.* 1914, i, 1866 ; [3]*Boston Med. and Surg. Jour.* 1914, i, 576 ; [4]*Therap. Gaz.* 1914, 306.

HÆMORRHOIDS. *Sir Charles Bent Ball, Bart., M.Ch., F.R.C.S.*

Immediate and Late Results of Whitehead's Operation.—Stone[1] reviews the results of this operation, performed in 470 cases by 45 surgeons, many of them by young internes, some during their first year of hospital service, so that the results are those that the average surgeon may hope to obtain. Minor modifications of the original Whitehead operation are not considered.

There were no deaths recorded in this series, nor any anæsthesia disturbances such as pneumonia or bronchitis. The author considers this may be due to the position of the patient on the operating-

table (head low and high buttocks), which prevented the gravitation of mucus, etc., into the respiratory tract. Amongst the early post-operative complications were hæmorrhage in 4 cases, local abscess in 7, and fæcal impaction in 2. The necessity for catheterization was not always noted.

In order to obtain late statistics, a series of questions was addressed to each of the patients, with a request for an examination if possible; as a result 185 cases were either seen or heard from; of this number, 31 had been operated on less than five years, 59 from five to ten years, 58 from ten to fifteen years, and 37 from fifteen to twenty-two years. Results are described as perfect in every respect in 134 cases (72·4 per cent); in 37 cases there was some impairment of sphincteric control, especially when the patients suffered from diarrhœa, but in only one case was there actual paralysis of the sphincter. This patient had developed hemiplegia five years after the pile operation, so that it is not clear to what extent, if any, the Whitehead operation was responsible. In connection with these cases of moderate incontinence, it must be remembered that in many cases of old-standing piles, the sphincter is weak and flaccid before operation. Itching and moisture of the anus are complained of in 16 instances. In 5 cases there was a certain degree of stricture; one of these was unaware of it, as it caused no symptoms, until it was detected by the author as a wire-like ring of fibrous tissue which readily admitted the index finger. In 14 cases there was recurrence in some measure, such as thrombic external piles, skin tags, or some bleeding. In 5 cases there was more extensive relapse; 3 of these were operated on a second time, and 1 who had been three times operated on, says he still suffers from hæmorrhoids.

Stone concludes that the Whitehead operation should not be considered a formidable procedure, or one which results "commonly in incontinence and stricture," as is frequently stated. It does not absolutely and for ever preclude the return of varicosities, as some of its advocates claim that it does. A definite indication for its employment is the existence of a rosette or complete circle of varicosities. The simple cases presenting one or several isolated hæmorrhoids may not require Whitehead operation for their relief, but the minor procedures are not so thorough, and seem less likely to result in a radical cure.

REFERENCE.—[1]*Ann. Surg.* 1913, ii, 647.

HAND, SURGICAL AFFECTIONS OF THE. *F. W. Goyder, F.R.C.S.*

Morestin[1] has been able to obtain permanent correction of *cicatricial contraction following inflammatory processes in the palm* by means of operation. Even if the tendons have been destroyed, a useful amount of active movement can be got by careful division of all the contracted tissues by the following method: The interossei and the palmar muscles, with the help of the remaining digits, appear to suffice. Everything opposing flexion must be divided: cutaneous

bridges, contracted tissue, remains of tendons, and capsular or joint ankyloses. An incision is made accurately along the summit of the contracted bridge of skin for its whole extent. At intervals on each side, transverse or rather oblique sections of the skin are made, especially where contractures are present. Dissection of these flaps gets rid of all contraction due to skin and subcutaneous tissues. Every deep structure which resists extension must next be divided in detail until over-correction is obtained and there is no immediate tendency towards contraction. The skin flaps are then replaced in the most favourable positions to cover the wound, such plastic manœuvres as may be required being utilized to close all but the smallest gaps. A few sutures may be put in where there is no tension. When firm union has occurred, massage and movements are begun. The results appear to be excellent.

Tubby,[2] in similar conditions and also after burns, and even in Dupuytren's contraction, makes a large number of incisions transversely to the bands of keloid material, with a fine and strong-backed tenotome. The incisions are not more than $\frac{1}{10}$ in. apart, and penetrate not only into the subcutaneous fat but extend $\frac{1}{4}$ to $\frac{1}{2}$ in. into the healthy skin. No attempt is made to arrest the bleeding except by pressure, after which a solution of **Thiosinamine** is vigorously rubbed in, and if the scar tissue is thick, a few drops are injected into the most prominent bands. Up to 20 min. may be injected. The part is then put up on a splint in as much extension as is possible without tearing the soft parts. The wound is healed in ten to fourteen days, when the mobility of the part is found to be increased by 50 per cent. The operation is then repeated, and may rarely be required three or four times.

In *Dupuytren's contraction*[3] his method is as follows: A longitudinal incision is made over the most prominent portion of the band in the palm, and, if necessary, cross incisions are made at the other end. Flaps are then dissected out and turned back; this is, perhaps, the most difficult part of the operation, as the skin is closely adherent to the affected fascia, and great care is necessary to avoid buttonholing. The flaps are held back by a thread of silk passed through each and tied at the back of the hand. Every portion of the affected fascia between the digital nerves is then dissected away. The tendon sheaths must not be opened. Hæmorrhage is arrested by pressure and by hot water. **Fibrolysin** is then poured on the open wound and thoroughly well rubbed in for two minutes, and in those cases in which the fibrosis has been extensive, a couple of drops are injected at five or six spots around the margins of the dissected area. Where the area is so extensive and the skin is so puckered and adherent that satisfactory dissection is impossible, he divides the bands subcutaneously, and stirs up the nodules by inserting a tenotome into the scar tissue and turning it round many times. If fibrolysin is then injected, it seems that such trauma is followed by disappearance of the nodules, precisely in the same way as occurs in the treatment of

ordinary scar tissue in the skin. The flaps in the palm are then most carefully sutured with horsehair. The hand is now put up on a splint in the fullest possible extension for fourteen days. This method has given better results than any previously tried, resulting in a perfectly soft and supple palm, without any scar tissue and with free mobility of the fingers.

Page[4] attributes the bad results so often following tendon suture to (1) Inadequate fixation of the divided ends; (2) Infection of the wound; (3) Too early movement; (4) Undue injury of the theca. In clean wounds operation may be done at once; otherwise it is best to wait till the wound is firmly healed. The theca should never be incised beyond the extent of the primary area. The distal end can be got by flexion of the terminal phalanx. The proximal end should be sought for with sinus forceps introduced into the theca. If it cannot be got by these means, another incision must be made higher up. In the fingers this is made over the neck of the metacarpal bone; the tendon is drawn out and replaced by attaching it to a flexible probe which passes through the theca and is drawn out through the original incision. In the thumb, the second incision is made on the proximal side of the wrist over the ulnar border of the flexor carpi radialis tendon. This is pulled to the radial side, the median nerve displaced ulnawards, and the tendon required lies behind and between. The theca is incised and the tendon pulled out. It is replaced with the help of the probe. Any of the methods for uniting the cut ends may be used. Where a good hold cannot be obtained with the suture, the author advises holding the cut ends of the tendon successively at their proper level in the theca, transfixing tendon and theca from side to side with iodized catgut, and tying the suture with sufficient firmness to hold the tendon in position. The suture should pierce the tendon about ¼ in. from the point of section. No attempt should be made to suture the theca. The digit is put up flexed on a pad, and kept up for a month. Massage without movement may be allowed after ten days. Full movement under gas should be performed eight weeks after suture; up to that time no vigorous use of the finger should be allowed.

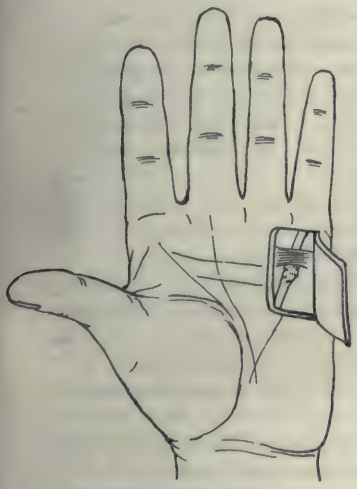


Fig. 53.—Abbe's Operation for Trigger Finger.
Subcutaneous section of the constricting band shown through the window.

Trigger Finger.—Abbe[5] finds that the constricting transverse fibres resting on the tendon sheath are situated exactly under the extreme flexure crease of the palm. He performs a subcutaneous

division in the line of the tendon (*Fig.* 53). The tendon is easily located by thumb pressure at the crease. A fine bistoury inserted in this crease has its point pressed down to the tendon and drawn along for ½ in. Relief is instantaneous and permanent.

REFERENCES.—[1]*Rev. de Chir.* 1914, ii, 1 ; [2]*Brit. Med. Jour.* 1913, ii, 1138 [3]*Ibid.* 1203 ; [4]*Lancet,* 1913, ii, 1762 ; [5]*Med. Rec.* 1914, i, 426.

HARELIP AND CLEFT PALATE. *F. W. Goyder, F.R.C.S.*

Nicol[1] thinks that the serious factor in harelip operations is the subsequent contraction of scar tissue. This he regards as unavoidable. It may lead to flat nostrils, notched lip, or asymmetrical mouth. These occur, he thinks, particularly where very extensive freeing of lip, cheek, and ala has been employed, and especially in unilateral harelip. He lays stress on the following points, which he finds useful in preventing subsequent contraction :—

1. Overtilting of the intermaxilla in alveolar cases so that the tip of the nose and the nasal septum are distinctly displaced to the deformed side. He employs both cutting and wiring of the intermaxilla.

2. He regards a certain amount of tension as less likely to produce subsequent deformity than free undercutting. If sutures are well placed, he says free separation is unnecessary.

3. He employs a tinfoil plate in cases where free undercutting cannot be avoided. This is moulded to the bone across the gap, stitched in place to it, and left for four to eight weeks.

4. He employs a vertical suture line, which should be placed strictly in the middle line, as subsequent contraction is less unsightly in that region.

5. He uses nasal splints applied at the time of operation, or later if the nostril is overcorrected in size. They are worn from one to three months.

[With regard to (1), it is undeniably bad to close the defect entirely from one side ; but this proceeding is not necessary even if no bone operation is performed. As to (2), the amount of undercutting necessary for a successful result undoubtedly diminishes as the experience of the operator increases. (3) appears to be a distinct advance in treatment. (4) is important only if a vertical suture line is employed.—F. W. G.]

Blakeway[2] reiterates what has been said by very many surgeons. In the absence of statistics it is useless to attempt to uphold the superiority of Brophy's and Lane's methods over Langenbeck's. They may be as good ; they may even be better ; but unless consecutive series of cases are published, it is the duty of conscientious surgeons to employ Langenbeck's operation, the results of which are known to be good. His paper lays more stress upon the closing of the cleft than upon the subsequent speech results. While the latter is most important, it is often forgotten how frequently operations for cleft palate are failures. Of the cases cited, 12 per cent were complete failures, 40·5 per cent had partial union, and 47·5 per cent were com-

pletely closed by Langenbeck's method after one or more operations. These are figures from 200 cases performed by sixteen operators; but the author notes that the results of two of the operators, accustomed to this branch of work, were much better than those of their colleagues.

G. Brown,[3] of Milwaukee, pleads for a connected plan of treatment in harelip and cleft palate. He says that if the mere covering of a palate fissure with tissue is to be the standard of success, all the recognized methods are applicable; but if effective speech improvement be the criterion, a wide range of distinction must be recognized.

The following principles should govern the choice of operation: (1) Never correct a deformity by surgery or by force if this can be made to correct itself in the natural course of development; (2) Never destroy any structure that may be required for the perfection of future developmental processes; (3) Never misplace or disarrange the form or situation of any tissue so as to impair its future functional usefulness; (4) Never exceed the reparative possibilities of tissue in flap formation by endeavouring to close completely at one operation the palate fissure of cases in which this is inadvisable; (5) Aim to improve, by operation if necessary, such operative conditions as cannot safely be overcome immediately.

The first two considerations bar the removal or destruction of the premaxilla, and the methods of closure by compression. If physiological action in the performance of the speech function is necessarily dependent on the restoration of palate tissues in natural anatomical relation, flap-reversing operations cannot give the best results. "This method does not ensure as close an approximation to normal palatal conditions as when these tissues are retained in natural form. There can be little doubt of the difference in speech effect that these distinctions presage in surgical selection." [No statistics are advanced in support of this contention.—F. W. G.]

"The Langenbeck operation has given me my best results, but any specific method of operation alone is insufficient to meet the demands of these cases. Only by systematic treatment from the very beginning in infancy, can the greatest benefits be conferred. It is the development of a complete system and the perfection of technique, rather than new or original operations, that are most to be desired. My system is as follows: Adhesive strip across lip. This simple measure calls into play muscles which would otherwise increase the deformity, and employs them as an aid to narrow the fissure and correct the prominence of the premaxilla and to straighten the deflected nasal septum. Better breathing and alimentation are facilitated.

"I perform Langenbeck's operation with certain modifications. One aluminium-bronze-wire retention suture is placed through the central portion of the soft palate. The correct decision as to lateral incision depends on the width of the fissure and the character of the tissue. Better speech results are favoured by incisions on each side

downward and backward behind the molar teeth, following as nearly as possible the lines of the muscular raphe, and the carrying of the soft palate muscles bodily towards the central line. A most important feature is to secure a good nose. Often, where the speech improvement has been disappointing, an unusually large nasal aperture or other nasal defect has been largely responsible, and surgical reconstruction has given results exceedingly gratifying to both operator and subject. Theoretically, the palate fissure should be closed before the child begins to talk. Practically this is not always so. I make every effort to provide as perfect a palate as possible at a sufficiently early age to make sure that no adverse speech habits have been acquired. All operations are completed if possible before two years, preferably at eighteen months or earlier. Nevertheless, some of my best speech results have been in patients from nine to sixty years, and some of the most imperfect in patients operated on before they were two years old. Therefore, perfection in form is of paramount importance, and often a more active factor in determining the speech results after cleft-palate operation than the speech habit difficulties which have been hitherto considered of first importance."

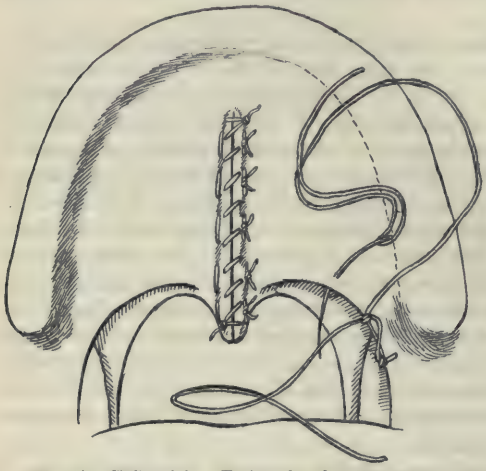


Fig. 54.—Cleft palate. Eastman's relaxation suture.

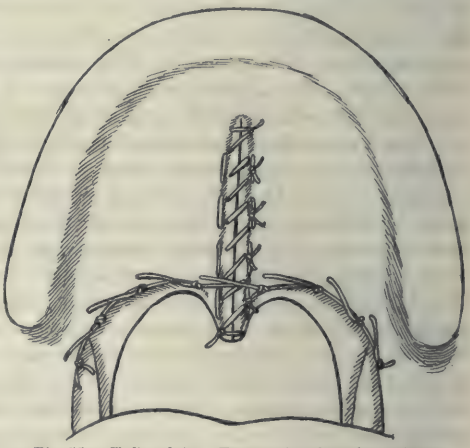


Fig. 55.—Cleft palate. Eastman's relaxation suture.

Eastman[4] says that in the Langenbeck operation there will be less chance of failure of union if the mattress coaptation sutures, after being reinforced by a simple running suture, are further supported

by a continuous relaxation suture passing along the free edge of the anterior palatine arch. Fine celloidin linen or von Brun's hemp is used. It may be introduced as a series of knotted loops or as a running button-hole suture. The former is the more secure. A small curved needle bearing a long thread is passed through the edge of the anterior palatine arch near its base on one side—i.e. near the side of the tongue. The thread is drawn through to its middle and secured with a reef knot, leaving the tail of the suture long (*Figs.* 54, 55). At a distance of 3 or 4 mm. from the first or outermost knot the needle is again passed through the edge of the arch, the tail of the suture is taken up, and another reef-knot tied. This process is continued around the anterior palatine arch to its base on its opposite side, crossing in front of the base of the uvula. The method of applying the running button-hole suture requires no explanation.

Eastman employs 5 per cent novocain with 0·02 per cent of adrenalin instead of general anæsthesia, injected from the lateral incision line towards the suture line. In the new-born 10 to 20 drops suffice. It facilitates operation, prevents hæmorrhage, and lessens shock. After the operation he washes out the stomach to get rid of swallowed blood, which, if left, is apt to give rise to fever.

He holds that there are so many varieties of cleft palate that no single operation will apply to all. In certain cases, Brophy's method cannot be disregarded. Malleable iron wire and plates with soft rubber pads, he prefers to silver wire and lead plates. He leaves the twisted ends projecting out of the mouth, and tightens them from time to time. After early operation, the nasopharynx is forcibly dilated and developed by breathing. Nutrition is not impaired, and the child is brought into normal condition before speech defects are established. [He offers no evidence in support.—F. W. G.] He does not doubt that surgeons who operate in the second or third year have a lower mortality than those who operate early. "Only the strongest survive the two or three years without early operation. The late operations are, therefore, good surgical risks. How large a percentage of those which are not operated on early, perish from disturbances of nutrition before the third year it would be difficult to estimate. It may safely be conjectured that the percentage is high. Many of such can be saved by early operation."

References.—[1]*Edin. Med. Jour.* 1913, ii, 419; [2]*Pract.* 1914, i, 219 [3]*Lancet*, 1914, ii, 687; [4]*Ibid.* 312.

HAY FEVER. (*See* Nose, Diseases of.)

HEART, DISEASES OF. (*See also* Auricular Fibrillation; Endocarditis; Heart-block; Heart, Syphilis of; Pericarditis; Rheumatic Heart Disease; Tachycardia.)

Carey Coombs, M.D., M.R.C.P.

Etiology.—Shumacker and Middleton[1] conclude from their observations on *athletes* in the University of Wisconsin, that "athletic training leads at first to physiological hypertrophy of the heart; but

when prolonged and marked by severer athletic contests, it usually leads to hypertrophy plus dilatation of a variable degree, frequently marked by valvular insufficiency. Functionally, the hypertrophied heart, even when dilated and giving distinct evidence of valvular insufficiency, may prove more fitted to carry the man through a severe athletic contest than a normal heart would be. On the other hand, acute cardiac dilatation occurs more frequently in athletes and men used to severe muscular strain than in normal men, and the ultimate effects are more prolonged and severe." Moreover, "there is reason to believe that for normal human activities an 'athletic' heart is distinctly disadvantageous."

Macdonald's[2] examination of reports on cases of *chronic valvular disease* has disinterred some interesting data. He shows that both aortic and mitral disease are prevalent in the fourth decade of life, but the maximum incidence of the former is reached in the decade following, that of the latter in the decade preceding. This difference is due to the fact that acute rheumatism, an early infection, is the chief cause of mitral disease, while syphilis and strain, later, are largely responsible for lesions of the aortic valves. As for factors precipitating 'failure of compensation' in chronic valvular disease, he finds that none were traceable in a majority of the aortic cases, the onset of failure being gradual. In mitral disease, on the other hand, some strain, such as childbirth, or severe infection, notably acute rheumatism, led to a sudden inception of symptoms of decompensation.

Symptoms and Signs.—Certain recent work helps to explain the mechanism by which the *paroxysmal dyspnœa* of chronic myocardiac disease is brought into being. Lewis, Wolff, Cotton, Reyffel, and Barcroft,[3 4] have made elaborate chemical blood analyses which go far to prove that the underlying cause is an acidosis. What acid it is does not yet appear. It is not one of the β-hydroxy-acid group responsible for most of the known acid-intoxications, and they do not think it is due to lactic acid. So far it has not been possible to say what is the origin of the metabolic breakdown, whether it lies in excessive formation of some acid, or in defective elimination. It is therefore not surprising that treatment, though directed to neutralization of acid, has failed to bring relief. The work of Lewis and his coadjutors is confirmed by Sellards.[5]

Clinically, dyspnœa of this kind is marked by deep, distressed breathing occurring in paroxysms, or continuous, but waxing and waning in intensity after the Cheyne-Stokes pattern. There is a notable absence of cyanosis. The case is nearly always one of chronic myocardial degeneration. As the writer of this review[6] has pointed out, there may be other symptoms suggestive of acid intoxication—delirium and unconsciousness deepening to coma, acetone smell in the breath, thirst, and so on; and the deep breathing observed at the height of the dyspnœa is strongly reminiscent of the air-hunger of diabetic coma. There is no excess of acetone to diacetic

acid in the urine. Like Lewis, he was unable to relieve the patients by alkalinization of the blood.

The *oculo-cardiac reflex*[7] has been studied by many. The term is applied to that slowing of the heart which follows quickly on firm compression of the eyeball. It amounts to a slowing of six to eight beats per minute in a majority of persons of normal health or suffering from gastric neuroses. It is normal in cases of arterial hypertension and in functional bradycardia. In exophthalmic goitre and in some cases of tuberculosis, syphilis and articular rheumatism, the response is excessive. In tabes, especially with Argyll Robertson symptoms, the reflex is absent.

Guthrie[8] adds another to the many tests of cardiac efficiency, the *cough-dilatation* response. The healthy heart, according to this writer, dilates when the patient coughs, but in a minor degree, and it returns quickly to the normal when the effort is over. In persons with enfeebled myocardium, there is an increase both in the extent of the dilatation and in the period of recovery, and the magnitude of this increase may be used as a means of estimating the degree of myocardial inefficiency. The presence and amount of dilatation may be measured by light percussion or by orthodiagraphy. According to Guthrie, observation of the right border of the cardiac dullness gives the best results. He regards the measurement of the time interval needed for recovery as of more importance than the estimation of the extent of dilatation.

Purjesz[9] records four cases, and the writer[10] two, in which *left recurrent laryngeal palsy* was associated with mitral stenosis. It is probably due to indirect compression of the nerve by enlargement of the left auricle, though the former writer thinks it impossible to exclude the influence of the pericardial lesions that so often accompany mitral valvular disease.

Hall[11] is of opinion that *relative pulmonary insufficiency* is not very rare in cases of mitral stenosis, fibroid phthisis, and other lesions which increase the tension within the pulmonary artery by offering resistance to the onflow of blood through its branches. The features upon which he relies to establish a diagnosis of this disorder are the presence of some definite cause for increased pulmonary tension; increase in the area of cardiac dullness, especially suggesting dilatation of the right ventricle; the existence of a soft diastolic bruit transmitted downward from the pulmonic area along the left sternal border, and liable to variations; absence of a pulmonary systolic thrill; and increase in the loudness of the bruit by excitation or forcible expiration. It is essential to the diagnosis that evidences of aortic regurgitation should be wanting. In one of the two cases quoted as examples, a post-mortem examination confirmed the absence of an aortic valvular lesion.

Irregularity of the Pulse.—(*See also* Auricular Fibrillation; Heart-block; Tachycardia, Paroxysmal.) *Intermittency of the pulse* is a phenomenon commonly observed at the bedside.

It arises from various causes, differing widely in prognostic importance, so that an imperfect understanding of the origin of the intermissions may lead to serious error both in prognosis and in treatment. Parsons Smith[12] presents these causes as follows:—

1. Respiratory arrhythmia, with long pauses, often recurring regularly with each expiration (common in children).

2. Intermissions due to digitalis medication producing (*a*) depression of conductivity, (*b*) alterations in rhythm (extrasystoles, etc.), (*c*) variations in irritability.

3. Sinus arrhythmia with long pauses. [This reaches its climax in cases of periodic arrest of the whole heart.—C. C.]

4. Extrasystoles, (*a*) ventricular, (*b*) auricular, in which the feeble premature beat fails to reach the wrist, an apparent intermission of the heart being thus simulated by a true intermission of the pulse.

5. Auricular fibrillation producing a proportion of beats too feeble to reach the wrist.

6. Auriculoventricular heart-block.

[To this list of causes may be added another—depression of contractile power so profound that the ventricle may fail to respond to normal stimuli.—C. C.]

Familiarity with these varying possibilities may enable the observer to recognize the meaning of an intermitting pulse without recourse to graphic methods; but even so, cases will arise in which polygraphic tracings are essential to an understanding of the irregularity.

Pulsus Paradoxus.—Falconer and McQueen[13] point out that, quite apart from the respiratory variations in the pulse so frequently seen in the subjects of sinus arrhythmia, the radial pulse may be notably diminished or even abolished during inspiration by: (1) Compression of the subclavian artery in the subclavian triangle, especially if shoulders be retracted; (2) Diminution of the blood-pressure, a phenomenon observed in normal subjects, but only sufficing to produce a palpable lessening of the radial pulse wave when added to the abnormally low arterial tension of various types of cardiac disease.

Treatment.—Willson[14] insists on the importance of **Rest** in certain phases of heart disease, coupled with systematic purgation to free the heart from the effects of intestinal autotoxæmia. The second principle on which he relies is reduction of the heart's work by lowering the peripheral resistance, and the measures applied to this end are very simple—the warmth of bed, entire freedom from worry or mental disturbance, minimal diet, occasional warm oxygenated baths. When the cardiac patient is critically ill the bowel must be kept moving, but not by drastic purgation. The heart must have room for its work; therefore intraperitoneal or pleural effusions must be removed and gastro-intestinal distention treated. Among his drugs Willson gives the first place to **Morphia** in the form of small hypodermic doses frequently repeated. After this he sets value on applications of **Heat** or **Cold** to the precordium. The ice-bag is preferred, but if the patient complains of the cold, a rubber hot-water bottle may be used.

As to climate, dry, warm out-door air at a moderate elevation is recommended. He lays proper stress on the necessity of securing sleep for the patient, and thinks morphine the only reliable hypnotic. **Massage** is another adjuvant to bodily repose. **Venesection** is also recommended in right-heart distention. A weak **Galvanic Current** applied to the precordium is of value in a few cases, he says. Warm **Saline Enemata** may be resorted to with benefit at times. As to direct cardiac drugs, he has a quite remarkable faith in the value of **Belladonna,** to prevent œdema of the lungs and to act as a cardiac stimulant.

Cyriax[15] gives a detailed description of cardiac **Mechanotherapeutics** as practised by the Swedish school of which he is an exponent.

The methods include : (1) Vibrations over the heart, the manipulating hand lying a little below the præcordium ; (2) Stroking movements over the upper præcordium ; (3) Tapotement over the heart, either with the tips of the fingers, or with the dorso-ulnar surfaces of the three inner fingers, or in the form of chest slapping or percussion over the heart with the loosely-closed fist ; (4) Side shaking ; (5) Heart ' suction ' with the hand ; (6) Shoulder hacking. All these are varieties of massage applied to the chest wall, and are regarded as influencing the heart, directly by mechanical pressure and indirectly by nerve stimulation.

More direct methods of stimulation are : (1) Pressure on the vagus nerve in the neck ; (2) Friction over the posterior divisions of the dorsal and cervical nerves, and over the intercostal nerves ; (3) Friction over the third cervical sympathetic ganglion.

The paper is illustrated, and technique is described with a wealth of detail.

The application of **Digitalis** to the treatment of cardiac disease continues to exercise many minds. Martinet[16] gives a good account of the value of the drug in relation to abnormalities of rhythm, summing up to the effect that it is almost specific in total arrhythmia ; of moderate value in paroxysmal, emotional, and febrile tachycardia ; usually contra-indicated by the presence of bradycardia or extra-systoles ; and absolutely contra-indicated by lesions of auriculoventricular conductivity. Agreeing in the main with these indications, Halls Dally[17] recommends the use of Nativelle's digitalin, and lays stress on the wide scope for the use of this drug in ambulant cases, i.e. for cardiac patients who cannot or need not be confined to bed. He administers it, for convenience' sake, in granules of $\frac{1}{240}$ gr. or $\frac{1}{600}$ gr. (·25 mgram and ·1 mgram). In his experience these small doses are adequate, though other writers have found larger quantities necessary.

Lawrence's[18] observations confirm those of other workers, to the effect that digitalis, when given in cardiac disease, does not raise the blood-pressure as it does in healthy persons and in animal experiments. It follows that it may be safely given to patients suffering from arteriosclerosis, angina pectoris, or nephritic hyper-

tension, if it be called for by concomitant symptoms of cardiac decompensation, since under such circumstances it rarely provokes a rise of blood-pressure.

For further notes on digitalis *see pp.* 9, 10.

The intravenous injection of **Strophanthin** has received a careful testing in the hands of Schleiter.[19] Two forms were used, ampoules and soluble tablets, without any distinct advantage on either side. The usual dose is $\frac{1}{60}$ gr., not to be repeated as a rule in less than forty-eight hours. If the solution enters the subcutaneous tissues instead of the vein, a cellulitis may result. Its action is that of other members of the digitalis group, but far more rapid than these administered orally. Its most decisive effect was therefore observed in cases of total arrhythmia, and in desperate examples of this condition it may be used to tide over the interval before digitalis, taken by the mouth, can produce its effect. Its action, when it is given to remedy total arrhythmia, begins to be manifest within half an hour, but the maximum effect may not be attained for seven or eight hours. Its influence lasts from three to ten days. In two cases of paroxysmal tachycardia the attacks ceased after injection of strophanthin, but whether as a result or not it is hardly possible to say.

Johannessohn and Schaechtl[20] write a commendatory notice of a strophanthus preparation called **Purostrophan.** It is said to exercise less pressure-raising effects than digitalis, to upset the stomach less, and to have no cumulative effect. Its diuretic action was marked. The cases quoted do not seem to have presented the indications which are nowadays regarded as calling for the use of a drug of this class.

Wiesel[21] has found **Cymarin,** an active principle extract of apocynum cannabinum, of great value in the treatment of chronic myocardial affections, such as cardiosclerosis and the renal heart. It may be given by mouth or by intramuscular injection.

The possibilities of **Surgery** in the treatment of heart disease are at present limited. It is true that it enjoys a certain scope in the therapeutic attack on lesions of the pericardium ; and an indirect application is recorded by Bauer,[22] who operated successfully on a case of embolism of the abdominal aorta complicating mitral stenosis. But hitherto surgery of the heart itself has been limited to the repair of injuries. Now, however, the papers of Carrel and Tuffier[23, 24] foreshadow a more direct attack on internal cardiac disease. The work is as yet in the experimental stage, but it is not impossible that means may be devised by which the mitral and aortic valves may be rendered accessible to the surgeon.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 1136 ; [2]*Glasg. Med. Jour.* 1914, i, 12 ; [3]*Brit. Med. Jour.* 1913, ii, 1417 ; [4]*Heart*, 1913, v, 45 ; [5]*Johns Hop. Hosp. Bull.* 1914, 141 ; [6]*Brit. Med. Jour.* 1914, i, 1230 ; [7]*Ibid.* 929 ; [8]*Jour. Amer. Med. Assoc.* 1914, i, 30 ; [9]*Wien. klin. Woch.* 1913, 1752 ; [10]*Bristol Med.-Chir. Jour.* 1914, 26 ; [11]*Amer. Jour. Med. Sci.* 1914, ii, 476 ; [12]*Pract.* 1914, ii, 196 ; [13]*Quart. Jour. Med.* 1914, Oct. 38 ; [14]*Ther. Gaz.* 1914, 19 ; [15]*Edin. Med. Jour.* 1913, ii, 504 ; [16]*Presse Méd.* 1914, 274 ; [17]*Med. Press*

and Circ. 1914, i, 282 ; [18]*Boston Med. and Surg. Jour.* 1914, i, 37 ; [19]*Amer. Jour. Med. Sci.* 1914, ii, 343 ; [20]*Deut. med. Woch.* 1914, 1412 ; [21]*Münch. med. Woch.* 1914, 771 ; [22]*Zentr. f. Chir.* 1913, Dec. 20 ; [23]*Med. Press and Circ.* 1914, i, 539 ; [24]*Ann. Surg.* 1914, ii, 1.

HEART, SYPHILIS OF. *Carey Coombs, M.D., M.R.C.P.*

Warthin,[1] after enumerating the various types of myocardial lesion that he has found in syphilis, says that he regards this infection, either congenital or acquired, as the most important factor in the production of cardiac disease, both endocardial and myocardial. This rather sweeping statement is based on his discovery that the heart muscle may show areas of parenchymatous degeneration in syphilis even when there are no obvious interstitial changes, and also that the myocardium may harbour large numbers of spirochætes even when the tissues appear intact.

Lian and Vernes,[2] having examined a series of cases of non-rheumatic aortic insufficiency, say that such a condition is practically always syphilitic, whatever the patient's age. The lesion is one not only of valves but of the aortic wall also. In adults, also, chronic aortitis without insufficiency is often syphilitic, even if it is accompanied by general arteriosclerosis and hypertension with renal disease. In elderly and old men this syndrome is usually attributable to other causes. These conclusions are for the most part based on the results of Wassermann tests. Neugebauer[3] quotes some interesting cases to show that congenital as well as acquired syphilis may provoke aortic disease, even to the point of aneurysmal dilatation.

Treatment.—At a meeting of Italian physicians[4] the general opinion was that syphilis is a very important factor in the causation of chronic progressive heart disease, and especially of the aortic class of lesion. The frequency of cardiac disturbances during the secondary stage of the infection was alluded to, and it was stated that after the first appearance of signs of cardiac failure in syphilitic aortitis the duration of life rarely exceeded three years. Many of the speakers favoured the use of **Salvarsan,** some even recommending it for advanced cases, while others insisted on the risks involved and advised cautious administration of small doses only.

References. [1]*Amer. Jour. Med. Sci.* 1914, i, 667 ; [2]*Presse Méd.* 1914, 204 ; [3]*Wien. klin. Woch.* 1914, 503 ; [4]*Policlinico (sez. prat.)*, 1914, xxi, 50.

HEART-BLOCK. *Carey Coombs, M.D., M.R.C.P.*

Pathology.—The most important observations of the past year are those published by Stanley Kent,[1] who first discovered the strand of specialized muscle that connects auricle with ventricle, and that has been erroneously named the bundle of His. Kent now adds to his former work the following discoveries : (1) In the neighbourhood of the auriculoventricular groove on the left side of the heart, neuromuscular structures whose constituents are partly nervous and partly muscular, which have connections with the nervous structures in the groove, and with the muscular tissue of auricle and ventricle ; (2) A

mass of hitherto undescribed nodal tissue in the right lateral wall of the heart ; (3) At least one muscular path, associated with this node, which transmits impulses and keeps auricle co-ordinated with ventricle even when the auriculoventricular bundle has been cut. Experimental results confirm this latter statement. These discoveries may be trusted to explain, in part at least, some of the discrepancies between anatomical and physiological findings which have puzzled those who believed that auricle and ventricle were connected by one path only.

Rénan and Géraudel[2] give an excellent account of the means by which a complete examination of the auriculoventricular bundle may be carried out. Cardiac histologists should consult this paper.

Gosse[3] adds another to the brief list of cases of heart-block occurring in acute rheumatic carditis. As in most such cases, the block was transient and incomplete, and the patient survived. Neuhof[4] records two examples of heart-block in pneumonia. One patient died, but the *a-v* bundle was intact.

Diagnosis.—Clarac and Pezzi[5] enumerate the auscultatory signs encountered in complete heart-block, as follows : (1) A soft systolic bruit at the mitral and tricuspid areas—a sign of no importance ; (2) Feeble auricular sounds scattered irregularly through the long pauses, and heard best along the left border of the sternum ; and (3) An intensification of the apical first sound at regular intervals, due to the rhythmically recurring coincidence of auricular with ventricular systole.

In papers by Petzetakis[6] and Loefer[7] we are reminded of the fact that heart-block may be simulated by slowing of the whole heart under extracardiac, nervous influences. The difference between the two can, of course, be readily established by the use of graphic records. In the absence of these, however, as both writers point out, certain tests are available : (1) Quickening of the pulse, often after a temporary retardation, by atropine injected subcutaneously ; (2) Quickening of the pulse by amyl nitrite inhalations ; (3) Further retardation by compression of the eyeball, the right side for preference (*see also* Heart, Diseases of, for further details of this oculocardiac reflex).

Treatment.—Thorne[8] claims that **Nauheim Baths** have a favourable action in cases of depressed auriculoventricular conductivity. Tracings are given to show that where the *a–c* interval was long before the bath, it returned to the normal after the bath. [Certain of these tracings exhibit a common fallacy. The pulse was quicker before the bath than it was afterwards ; this led to fusion of the *v* wave of one cycle with the *a* wave of the next in the jugular trace, simulating a lengthening of the *a–c* interval. When the pulse was slowed by the bath, this fusion, with the fallacy dependent on it, disappeared. —C. C.]

References.—[1]*Brit. Med. Jour.* 1914, ii, 105 ; [2]*Presse Méd.* 1913, 777 ; [3]*Brit. Med. Jour.* 1914, i, 1347 ; [4]*Jour. Amer. Med. Assoc.* 1914, ii, 577 ; [5]*Presse Méd.* 1914, 590 ; [6]*Ibid.* 161 ; [7]*Presse Méd. Belge*, 1913, Nov. 9, 163 ; [8]*Pract.* 1913, ii, 688.

HEMIPLEGIA, ACUTE. *Purves Stewart, M.D., F.R.C.P.*

The vast majority of cases of acute hemiplegia are of vascular origin. When we are called to such a case, one of the first questions we have to determine is whether the cerebral lesion is due to hæmorrhage, to thrombosis, or to embolism, since the treatment differs accordingly. Grober,[1] of Jena, in a clinical lecture on this subject, indicates the ordinary modern procedures in Germany, which do not differ essentially from those employed by English and other physicians.

Cerebral embolism usually occurs in patients who are already the subject of cardiovascular disease, and generally results from detachment of a vegetation from one of the valves of the left heart, either in acute ulcerative endocarditis or in valvular disease of older standing. Sometimes the emboli are derived from the roughened inner wall of an arteriosclerotic aorta, or from an aortic aneurysm. Travelled thrombi from pulmonary veins are the rarest cause of cerebral emboli. In cerebral embolism the onset of hemiplegia is usually sudden, and there is no loss of consciousness. Once the diagnosis is established, the object of treatment must be to refrain from doing anything which can loosen the embolus, and permit of it being swept further on, whilst meanwhile we should try to prevent fresh emboli from being set free at the site of the primary valvular lesion. The heart, therefore, must not be stimulated. Absolute **Rest** is essential, preferably with the patient's head raised, and with an ice-bag over the heart. Full doses of **Morphia** hypodermically are also often advantageous.

Cerebral hæmorrhage is much commoner. It occurs chiefly in patients with high blood-pressure, and the exciting cause is often some incident which temporarily increases this pressure still further, e.g. physical exertion, emotional excitement, straining at stool, etc. The occurrence of unconsciousness depends mainly on the size of the hæmorrhage. Small hæmorrhages do not usually produce unconsciousness, unless they are low down in the brain-stem, e.g. in the pons or medulla. In the treatment of cerebral hæmorrhage we attack the excessive blood-pressure primarily. Absolute **Rest** in bed, with the head raised, an ice-bag, **Ice-Cap,** or a series of cold compresses may be applied to the head, which may sometimes conveniently be shaved. **Bloodletting** is often of great value, preferably by venesection or venepuncture of one of the superficial veins of the arm or leg. In this way the dangerously high blood-pressure can often be promptly relieved for the time, thereby increasing the chance of arrest of the hæmorrhage and of coagulation of the effused blood. From 12 to 20 oz. of blood may thus be withdrawn. Leeching and wet-cupping have long since been discarded as inferior to venesection. In addition, **Hot Applications to the Feet** and **Nitroglycerin** internally may further reduce the intracranial blood-pressure. Lastly, a drop or two of **Croton Oil** on the tongue, even in an unconscious patient, will succeed in inducing free evacuation of the bowel.

When the hemiplegic attack is due to *thrombosis of a cerebral artery* the conditions of the circulation are different. The attack occurs

when the heart is at its feeblest. Very often the onset is during sleep, so that the patient wakes up, and only discovers his hemiplegia when he tries to stand or walk. In treating such a case, we try to stimulate the general circulation, and in particular to increase the blood-supply to the brain. For this purpose the patient's head should be lowered, all clothing about the neck being fully loosened. Grober suggests cautious autotransfusion by bandaging the limbs in a centripetal direction. At the same time he admits that this procedure may favour the occurrence of thrombosis in the limbs if the vessels are sclerotic. It is better to devote our main efforts towards stimulating the heart. Hypodermic injections of **Camphor,** every half hour at first, may be employed ; or, even better, we may employ intravenous injections of **Digalen** or **Strophanthus.** If these drugs are not available, **Alcohol,** strong **Coffee,** or **Tea** may be given by the mouth. Venesection must be avoided in thrombosis as assiduously as it is to be recommended in cerebral hæmorrhage. **Morphia** hypodermically will help to subdue the general restlessness, and may be administered at the same time as the digalen or strophanthus. In this way the thrombosis has a better chance of ceasing to spread.

REFERENCE.—[1]*Deut. med. Woch.* 1913, 2385.

HERNIA. *E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).*

Moreau[1] advises an *autoplastic closure* of the muscular aponeurotic layers of the inguinal canal. It involves a slight modification only of the technique of Bassini, the cord being lifted and the aponeurotic layers somewhat overlapped. This has also been recommended by Lucas-Championnière and by Fournell, as well as Girard. It involves the principle of imbrication or overlapping, known in America as the Andrews operation, first described in 1894.

An important and unsettled question is the *relation of trauma to hernia*, as this has certain medico-legal aspects. The question is discussed by Scharezky.[2] It is true that hernias follow after injuries in a large number of industrial accidents, yet these are of the inguinal type. Inasmuch as operation or autopsy usually shows a congenital defect, it is still a matter of dispute whether the trauma is a real etiological factor.

Morton[3] discusses certain unusual conditions found in operating for hernia in the Bristol General Hospital. In undescended testicles it is not uncommon to find that the vas makes a slight excursion in the wall of the sac in front of the testis. It is a question whether such imperfectly developed testes lying inside the peritoneal cavity are capable of development ; if not, they are none the worse for removal, and there are difficulties in bringing them properly outside the canal. The writer has also found globules of fat, and these may contain in their centre small accessory sacs. Such fatty masses should always be removed in herniotomy, to prevent recurrence. Speed, reporting on the prevalence of lipomata in inguinal hernia, analyzes 156 inguinal herniotomies, especially examined for this feature in the

clinic of Dr. Andrews in the last year. Of this number, 86 showed distinct lipomas, some of them of fair size. In all cases these were isolated and found to have a pedicle at the internal ring. If not removed, these have a tendency to act in such a way as to re-open the canal and cause recurrence. They should be removed high up, and their bases be ligated, as they nearly always contain small vessels.

Lathrop[4] discusses the relation of *umbilical hernia* and lipectomy. Umbilical hernia is more frequent in women than in men, in the ratio of about twelve to one. The hernia often reaches a very large size. By lipectomy the writer means the removal of a greater or less amount of skin and fat from the abdomen. This has been advised by various writers and extensively practised, as by Kelly, Maylard, Weinhold, and others. The fat and superfluous skin are a burden to the patient, and the removal of the pendulous mass assists in repair. An additional advantage of removing such masses is that it lessens the thickness of the abdominal fat, and renders access to the field easier during the operation.

Dun[5] reports 220 cases of hernia in children operated on in the out-patient department. For years there has been difficulty in dealing with the large number of cases of hernia in the dispensary, sometimes eight or ten of the ward beds being occupied by children suffering from hernia, while many others were kept waiting for long periods before they could be admitted. The practice was then started of doing a radical operation in the out-patient department. Of 220 patients thus operated upon, 205 were inguinal—174 single and 31 double; 15 were umbilical. There was no mortality. Two hundred and eighteen cases healed by first intention. In 2, the wound broke down entirely on the tenth day. Another developed small abscesses with the *Staphylococcus albus* about the skin suture, but did not break down. It is his rule not to operate unless the child is well nourished and in good general health; never to operate when there is cough, or without adequate preparation. The skin is disinfected with chloroform and iodine, 1·5 per cent in infants, and 3 per cent in older children. This is done in preparation, and the skin painting is done on the operating-table after anæsthesia. No dermatitis has resulted. In the technique it is considered important to obliterate all dead spaces in the wound by buried subcutaneous catgut sutures. The wound is dressed with flexible collodion, which remains until the seventh day. The writer believes that the day has passed for discussing relative merits of truss and operative treatment, the latter being preferable in ordinary cases.

Remsen[6] reports cases of subcutaneous or concealed injury of hernial contents. Weakening of intestinal walls by disease and by interference with circulation, and also trauma to the mesentery, may determine a rupture with relatively slight injury. Cases have been reported of rupture of the intestine in a hernia from crushing accidents, blows, kicks, falls, and so forth. The direction of application of the force has some influence, as well as the pressure by parts

of the bony skeleton. The action of the diaphragm in relieving intra-abdominal pressure also modifies the extent of the injury. Such injuries are focussed upon the bowel imprisoned between opposing walls, and, therefore, not uncommon in hernias. The increased intestinal pressure from the sudden forcing of the gas out of one section of the bowel into another has sometimes been called an explosive effect in rupture of the bowel in hernia. Scrotal hernias are relatively more exposed than incomplete. The writer reports 5 cases in which the intestine was ruptured in the hernial sac, with 3 recoveries and 2 deaths.

Schley[7] recommends rectus transplantation to fill the defect in the internal oblique muscle in certain hernias. This appears to be, from his drawings, the old method of Halsted and Bloodgood. He also gives diagrammatic sketches showing the imbrication or Andrews's operation, combined with the outward traction of the rectus muscle.

The question of recurrence after operation for cure of inguinal hernia is discussed by Hull,[8] who thinks that the former high percentage of failures is due to obsolete methods which can now be avoided. Among these errors are imperfect extirpation of the sac, imperfect closure of the internal oblique muscle, the use of sac ligature alone without repair of the muscle, and the use of displacement methods, such as Kocher's operation. By proper plastic work, Hull believes the percentage of recurrences can be reduced to almost nothing.

In femoral hernia, Thompson[9] advises a new operation, employing a celluloid filigree, shaped to fill the triangular femoral space. The writer had already called attention to the value of celluloid in various departments of surgery. The conical, curved celluloid plug, about the form and size of the femoral canal, is light and hollow. It is inserted through the saphenous opening with the point upward, when it will be found to nearly obliterate the space. The sutures hold it in place, and it is found to become encysted nicely in the tissues. The wall of the hollow cone-shaped appliance is perforated, so as to form a kind of filigree.

Further contribution to the radical cure of femoral hernia is offered by Vautrin,[10] of Nancy. The most important modification noted in his technique is the use of the inguinal route, after the manner of Annandale and Zuckerkandl, as a means of access to the femoral ring. This has also been advised by Ruggi and Parlavecchio, and Gordon. The inguinal canal is opened, the pedicle of the hernial sac is drawn from above inward and upward, and removed by ligation. Closure of the femoral canal is easily completed with one or two sutures. In strangulated hernia this has been found to give excellent, quick access. In this operation the incision is quite similar to that of inguinal hernia. The operation is comparatively simple if the hernia is reducible, but may be impossible in incarcerated cases. The end-results in a series of Vautrin's cases were excellent. Twenty-five successful operations by this method are reported by the writer, all with good recovery and without complications.

Andrews,[2] of Chicago, reports a series of cases of patching or repairing hernial defects in inguinal, ventral, and umbilical hernias with transplants of the fascia lata. These are sewn into position after careful removal from the thigh, in double inguinal hernias one triangular piece crossing both canals. No failures have been reported in this series, all of which were autoplastic transplants.

Mauclaire[11] reports one case of repair of a large muscular hernia by the use of an autoplastic transplant from the fascia lata. He excised the margins of the opening after the manner recommended by Giess, and sutured the transplant neatly so as to fill the opening. A good result followed this procedure.

One hundred and five cases of *strangulated hernia* are reported by Alexander.[12] The mortality remains as high to-day as twenty years ago, this being due to popular ignorance on the subject, and the late hour of operation. In this series, 58 were males and 47 females; 60 inguinal, 25 femoral, and 20 umbilical. Six cases were admitted moribund, and no operation was attempted. The author warns against the dangers of delay. Thirty-six of this series ended fatally.

Craig[13] reports a case of hernia of the uterus, vagina, and Fallopian tubes. This case, which was successfully cured by operation, adds one to a limited series now on record. Farrar[14] reports a case of hernia of the uterus and both adnexæ. In 1906, Andrews, of Chicago, collected from the literature 167 cases of hernia of the ovary alone, 46 cases of hernia of the Fallopian tube alone, and 82 cases of hernia of the ovary and tube together. Less interest seems to have been aroused in the later history of this trouble; but in the last eight years a number of new cases have been added to those on record. The diagnosis, apart from operation, is difficult. Operation has also been urgently needed and particularly difficult in the pregnant uterus. Two varieties of these herniæ, namely, inguinal and femoral, are noted, the inguinal being far more common. Hernia of the uterus occasionally occurs in infancy. It is always secondary to hernia of one adnexa. Pirami[15] also reports seven cases of inguinal hernia containing the adnexæ, all in the service of Professor Cordero. The herniotomy in each case was completed by the technique of Bassini.

Fraser[16] reports cases of *umbilical hernia in children* treated by the elastic ligature. Suitable cases for this operation are those above six months, and by preference more than one year old. During the pre-operation period, a pad is worn to reduce the size of the ring. The essential material is a piece of elastic cord one-eighth of an inch in diameter and about 3 inches long. The actual technique of the operation is as follows: The skin over the fundus of the protrusion is grasped with a pair of dissecting forceps, and skin and sac are pulled gently upwards from the abdominal wall. Great care is exercised in ascertaining that the contents of the sac are completely reduced. Three small incisions are made at equal intervals around the periphery of the sac, at the point where the skin is reflected on to the abdominal wall. (*Figs.* 56, 57.)

Haynes[17] advises an inversion method in giant ventral hernias. Large elliptical incisions expose the sac, which, with the external fascia of the abdomen, but not the skin, is crowded inward and inverted inside the fascia. The latter is then brought together over the inverted mass with large kangaroo-tendon sutures and forms a kind of pad, not unlike the MacEwen sac method. The abdominal wall beyond the ring is then inverted by a second row of stitches one or more inches from the margin, so as to prevent a projecting inward bulge or plug, quite in contrast with the overlapping practised by some American surgeons. This is the second report upon this method, and embodies fourteen successful cases.

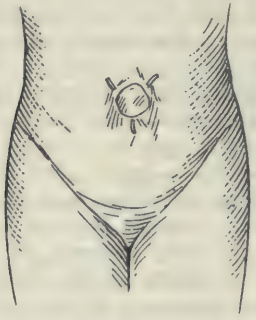


Fig. 56.—Showing radiating skin incisions round the hernia.

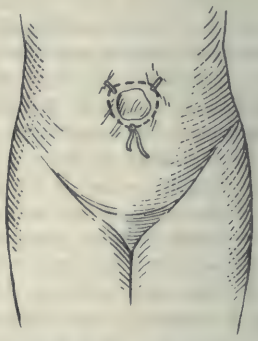


Fig. 57.—The elastic ligature is lying in position. In practice it lies more closely round the pedicle of the sac.

Quénu and Constantini[18] discuss the indications for intestinal resection in the radical cure of certain hernias. It is indicated in case of any neoplasm of the bowel, or a tuberculous intestine, or any form of stricture or injury which might disable its function. Under these various indications, numerous cases by Ranon, Quénu, Lejars, Lecène, and others are reported. *Plate XXVI* shows the diseased condition requiring this resection. Tuberculous masses in the bowel wall, extensive deforming adhesions, wounds of the intestine, and early neoplasms may all call for resections during herniotomy. The twelve cases reported in this paper showed only one death, this patient having had 30 cm. of large intestine resected.

REFERENCES.—[1]*Presse Méd.* 1914, 194 ; [2]*Zeits. f. Chir.* 1913, 1918 ; [3]*Bristol Med.-Chir. Jour.* 1914, 12 ; [4]*Ther. Gaz.* 1914, i, 156 ; [5]*Liverp. Med.-Chir. Jour.* 1914, 95 ; [6]*Ann. Surg.* 1913, ii, 365 ; [7]*Ibid.* 473 ; [8]*Ibid.* 479 ; [9]*S. Afr. Med. Rec.* 1913, 397 ; [10]*Arch. Gén. de Chir.* 1914, 535 ; [11]*Ibid.* 807 ; [12]*Ann. Surg.* 1913, ii, 639 ; [13]*Brit. Med. Jour.* 1914, ii, 176 ; [14]*Surg. Gyn. and Obst.* 1913, ii, 586 ; [15]*Clinica Chir.* 1914, 213 ; [16]*Lancet*, 1913, ii, 925 ; [17]*Amer. Jour. Surg.* 1914, 213 ; [18]*Rev. de Chir.* 1914, 401.

HERPES ZOSTER.

(*Vol.* 1914, *p.* 294)—For the treatment of herpes zoster in the area of the trigeminal nerve, McNab recommended **Ionic Medication**, using sulphate of quinine solution. This treatment may be applied with profit to cases of post-herpetic neuralgia in this area.

PLATE XXVI.

LARGE CYST OF INTESTINAL WALL

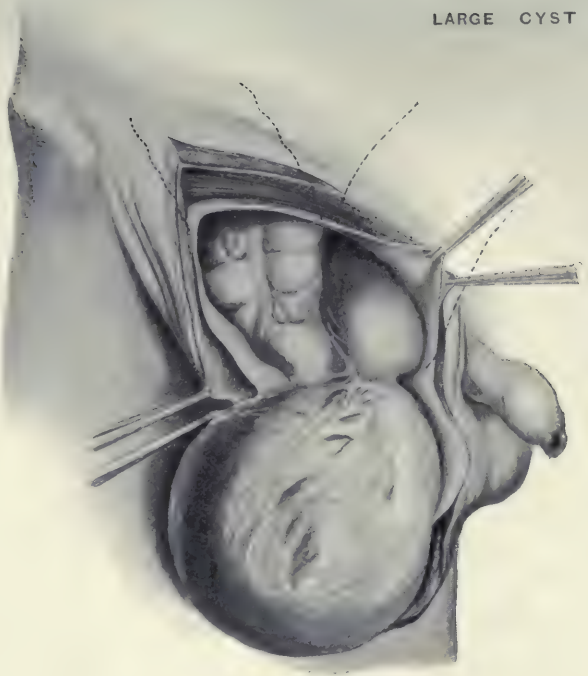


Fig. A.—Lecène's case

Fig. B.—Section of mass

Drawn from the "Revue de Chirurgie.

HETEROPHORIA. (*See* EYE MUSCLES, AFFECTIONS OF.)

HYDROCEPHALUS. (*See* BRAIN, SURGERY OF.)

HYDROPHOBIA. *Purves Stewart, M.D., F.R.C.P.*

Harris,[1] of St. Louis, records seven fatal cases of hydrophobia. He makes the astonishing statement that many people (apparently in the United States) deny the existence of this disease. He expresses the hope that the seven fatal cases recorded by him may " in a measure add strength to the evidence of the existence of hydrophobia, and give pause to those opponents who desire light."

The symptoms in the foregoing cases were all very similar. After a period of acute mental excitement, often amounting to delirious mania, progressive pharyngeal spasm rapidly developed, together with difficulty in the swallowing even of fluids. Opisthotonic spasms and spasm of respiration produced death in from one and a half to seven days after the onset of the first symptoms. In six cases out of seven, autopsies were held, and although Negri bodies were looked for, only in one case were they demonstrated in the brain. In all the others, however, inoculation of brain-substance into rabbits produced typical and fatal paralytic phenomena, together with abundant Negri bodies. The incubation-period in the inoculated rabbits varied from twelve to thirty-five days.

Harris also records one more case of hydrophobia which recovered after intravenous injection of **Hydrochloride of Quinine and Urea,** 15 gr., dissolved in 3 c.c. of normal saline solution. These injections were repeated at intervals of two hours for three injections. The fourth injection followed two hours and a half after the third. Next day (i.e. ten hours after the fourth injection) a fifth was given, and, finally, a sixth fourteen hours later. This made a total of 90 gr. in all. After the second injection the pain disappeared from the scar and the patient became able to swallow milk. Next day he swallowed milk, coffee, and biscuits, and was discharged on the fourth day, free from symptoms. Nine hours after the fourth injection of quinine and urea, a lumbar puncture was done, and the cerebrospinal fluid was injected subdurally in rabbits and guinea-pigs, also into the cervical plexus of guinea-pigs, but without inducing any symptoms.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1913, ii, 1511.

HYPERTRICHOSIS.

For suggestions as to therapeutic application of **X Rays** *see p.* 65.

(*Vol.* 1914, *p.* 296) —**Electrolysis** is the method of election for the removal of superfluous hairs. Full details are given at the above reference.

INFANT FEEDING, AND FOOD DISORDERS IN CHILDHOOD.

Frederick Langmead, M.D., F.R.C.P.

The supreme importance of feeding the baby from the breast is well established and generally recognized, but it must be confessed that unnecessary weaning is rife. H. C. Cameron[1] has briefly reviewed the chief advantages of breast feeding. First, the severer forms of

alimentary disturbances are far more common among bottle-fed than among breast-fed children. Second, although the liability to contract infectious disorders such as common colds, influenza, bronchitis, tonsillitis, etc., is no greater in the artificially fed than in the infant at the breast, yet when such an illness has been contracted, the prostration of the child, as well as the effect upon growth, is much more marked. Third, the artificially-reared child is apt to show signs of the unnatural character of his diet. The weight is sometimes unsatisfactory. The skin has frequently an unhealthy pallor, whilst pressure on it easily produces a blotchy erythema which does not fade for a long time. The feet and hands are often cold and cyanosed. Transitory urticarial and erythematous rashes are liable to occur. The movements of the bottle-fed infant are less vigorous and powerful, and the normal functions, such as grasping, sitting, etc., are acquired later. In a sitting posture the back is apt to become kyphotic. The recti abdominales are separated, and umbilical or inguinal herniæ are common.

He emphasizes the truth that the main factors which determine the initial secretion of milk in the mother's breast reside in the child and not in the mother. Neglect of this consideration explains the failure of many women to furnish sufficient milk for their offspring. The secretion of milk is controlled chiefly by the sucking of the child. Over-work and under-feeding of the mother are often regarded as potent causes of a failure of her milk supply. Cameron agrees that these factors may produce deterioration in the *quality* of the milk in the later months of lactation, but considers that in the first establishment of the milk, the part of the mother is comparatively a passive one provided that the nipples are well formed. He deprecates the use of mixed feeding in cases in which there is a tardy appearance of a sufficient supply of milk. The activity of the secretion of milk by the breast depends upon the vigour of the child's sucking movements. If the child is satisfied by other food it sucks apathetically, and thus the chance of stimulating the breasts to greater efficiency is lost. Before resorting to artificial feeding every means should be taken to aid the establishment of the breast secretion. In most of the cases of prolonged inanition at birth, waiting is a less evil than weaning, and meanwhile much may be done to combat the condition. The infant must be kept warm. For this purpose he recommends the use of three or four small hot-water bottles, kept at some distance from the child, and each refilled in turn. The baby must be put to the breast at regular intervals, and every attempt must be made to induce him to empty it. A three-hourly interval is not too long, each breast being used alternately. When the infant will suck no more, the breast should be emptied by a breast pump. The mother's health and comfort should receive attention. Rest, sleep, and a nourishing diet, with a sufficiency of fluid, are necessary. Attention should be directed to any cause for the failure of lactation which may be detected, and if such be found, suitable treatment should be instituted. A

device he has found very effective is to put back to the breast the child of a year old which had been weaned only a short time before; unfortunately this procedure is not often available. If there are rapid loss of weight uninfluenced by these measures, attacks of cyanosis or syncope, and slowness, feebleness or irregularity of the pulse, more food is required. This is best supplied by giving the milk drawn off by the breast pump, after the infant has finished sucking. If this is insufficient, nothing remains but to give artificial food, preferably in the form of a single feed in the evening, continuing the breast-feeding in the day. Unfortunately, this usually marks the beginning of the failure of the mother's milk, and of the need for increasing quantities of artificial food.

H. R. Riddle[2] records a series of cases showing the beneficial effects of **Lactagol,** in increasing the amount of milk secreted and in raising its fat content. It was given in teaspoonful doses, in milk, three times daily.

During the last twelve months little has been added to our knowledge of the subject of *artificial feeding*. I. A. Abt[3] briefly reviews the injuries which are produced by an excess of starch in the infant's food. These effects, called by the Germans "Mehlnahrschaden," have been much discussed in their literature in the last few years, especially by Czerny and Keller. These authors hold that starch in small amounts is not injurious to infants, but that if it be given in large amounts for a considerable period, certain definite trains of symptoms arise. This is especially so if no milk is added to the starchy food. Frequently these ill effects are seen in infants who have suffered from gastro-intestinal disturbance, and for whom the physician has ordered water containing starch, either barley, rice, or oatmeal, when these foods are persisted in too long, or if no milk is added. The results are probably due to a deficiency of protein, fat, and salts in the diet. Water is retained in the tissues, which causes the infant to appear plump, though pasty and pale. There is a diminished resistance against infections. Dyspeptic disorders, with diarrhœa and loss of weight, result. If the inanition continues, fermentation with inflammatory changes and loss of function of the alimentary tract are inevitable.

Three main types of this disorder are described: (1) The *atrophic*, in which the muscles are hypertonic, the tissues dry, the skin and mucous membranes pale, and the abdomen distended; (2) The *hydræmic*: this occurs most frequently in cases in which salt is added to the starch preparations, or in which only a small quantity of milk is used. These children remain stationary, or increase in weight. If milk is given weight is lost, to be regained if the starchy diet is resumed. The babies are œdematous and pasty; the muscles are soft and flabby. Such children are very subject to infections, such as bronchopneumonia, pharyngitis, otitis, abscesses, etc. (3) The *hypertonic*: this is the rarest form. The muscles are rigidly contracted, and are stiff and board-like. The spine is rigid and the head

retracted. The arms and legs are adducted and the forearms flexed. There is undue excitability to electrical stimulation, and tetany may be elicited.

The atrophic form is the most amenable to treatment. This consists, for all forms, in the administration of Milk containing a moderate quantity of fat. Carbohydrate food should be avoided. Breast-milk is the best remedy, and for this condition should be given in small quantities at frequent intervals. If breast-milk is not available, undiluted cow's milk may be given, or cow's milk diluted with water. In some cases top-milk mixtures are indicated, but care should be taken not to exceed the infant's toleration for fat.

Maynard Ladd[4] has contributed an interesting article on the influence of alkalis on gastric motility. Sodium bicarbonate or lime water was added to meals which also contained bismuth, and the rate of emptying of the stomach was noted by radiography. It was found that these alkalis hastened the discharge of the gastric contents into the duodenum. The latter part of digestion was that which was most shortened.

References.—[1]*Lancet*, 1913, ii, 911 ; [2]*Med. Press and Circ.* 1913, ii, 643 ; [3]*Jour. Amer. Med. Assoc.* 1913, ii, 1275 ; [4]*Boston Med. and Surg. Jour.* 1914, i, 518.

INFANTILE PARALYSIS. (*See* Poliomyelitis.)

INSANITY. (*See also* Dementia Præcox, General Paralysis, Manic-Depressive Insanity.) *Bedford Pierce, M.D., F.R.C.P.*

Israel Cohen,[1] after showing that Jews generally speaking compare favourably with other races in respect to many diseases, and that Jewish children are usually healthier than others living in the same cities, discusses the peculiar liability of the race to nervous and mental diseases. He quotes authorities stating that "the frequency of mental diseases among Jews is from two to five times higher than among non-Jews." "It is chiefly nervous disease of a functional order, however, to which they are subject, particularly neurasthenia and hysteria, the latter being found among males to a notable degree." On the other hand, they are less liable to organic nervous disease, owing to the comparative infrequency of alcoholism and syphilis. This marked incidence of insanity is attributed to the effect of an endless cycle of persecution, their sedentary occupations in towns, and the anxiety incidental to commercial undertakings under unfavourable conditions. On the whole, suicidal tendencies are rare except amongst the rich ; these are most common in Western Europe and America, "where the struggle of life is keener and the bases of faith are weaker." In Prussia, statistics of the ten years 1890–1901 show that, whilst the rate amongst the non-Jewish population has remained almost stationary, it has increased amongst the Jews from 18 to 32 per 100,000.

Pathology.—An important contribution to the pathology of mental disease has been made by Shaw Bolton in his book, "The Brain in Health and Disease" (Edward Arnold, 1914). The volume

contains particulars of researches extending over eighteen years, which add greatly to our knowledge of the characteristic variations of structure in different parts of the cerebral cortex. The pioneer work of Bevan Lewis at Wakefield in this direction has been greatly extended by his successor. The areas of the brain specially investigated are the visuo-sensory, the visuo-psychic, and the prefrontal. An immense number of micrometer measurements have been made to show the relative thickness of the various cell laminæ in health, in mental enfeeblement, and in insanity. Besides this, the order of development of these laminæ has been studied. As a result of these and other researches, Shaw Bolton has arrived at conclusions which, if confirmed by other authorities, promise to be of far-reaching importance, the more so as they are correlated with clinical experiences. The anatomical basis of certain forms of mental disorder is carried a decided step forward, and the claim is made that a classification rests upon definite pathological findings. The following extracts will serve to illustrate these points :—

" I subdivide all cases of mental disease into two categories, namely : (1) Cases which, from the macroscopic post-mortem aspect, exhibit abnormal, no abnormal, no morbid, or slightly morbid appearances ; and (2) Cases which exhibit morbid signs of any higher grade of intensity, and, in some instances, abnormal appearances also. The former group, from the clinical aspect, I class under the term *amentia*, which I employ to connote the mental condition of patients suffering from deficient neuronic development ; and the latter under the term *dementia*, which I employ to signify the mental condition of patients who suffer from a permanent psychic disability due to neuronic degeneration following insufficient durability.

" The subjects of amentia, therefore, as I shall suggest from the macroscopic and prove from the microscopic aspect, suffer from a more or less marked grade of sub-evolution of the cerebrum. The chief clinical varieties of amentia are low-grade amentia, or idiocy and imbecility of all grades with or without epilepsy, and high-grade amentia, which includes moral, unstable, and excited cases, together with cranks and asylum curiosities, recurrent cases of all types, hysteria, epileptic insanity, and true paranoia and allied cases.

" The subjects of dementia . . . . suffer from a more or less marked grade of involution and dissolution of the cerebrum. I group all such cases into a primarily neuronic class composed of senile, presenile, mature, and premature types ; into a progressive and secondary class which includes senile and presenile dementia associated with gross degeneration of the cerebral vessels, and general paralysis and kindred pathological conditions ; and into a class of special varieties following sense deprivation, epilepsy, and cerebral lesions.

" This generalization of amentia and dementia is a gross one, and, as I shall indicate, is based on the fact that cases of mental disease exhibit a lesion of the cortex of the prefrontal region of the cerebrum, which lesion, in the case of amentia, is of the nature of a true sub-

evolution, and, in the case of dementia, is of the nature of a true involution or dissolution. The existence of amentia does not preclude the onset of dementia, the milder grades of which may in fact be regarded as the normal result of cerebral senility in all persons, sane or insane, who survive to the necessary age-period, which, however, varies greatly in accordance with their individual personal cerebral durability. In many idiots, for example, cerebral senility occurs before the age of forty years, and in some normal persons indications of its onset are absent at the age of eighty.

" The necessary precursor of dementia, whether this be severe or mild, of rapid or of slow development, is a more or less severe grade of *mental confusion*, which term I employ to connote, in the broadest sense, the mental symptoms occurring in association with certain pathological states of the cortical neurones, which may be followed by the recovery, or by a more or less extensive dissolution, of these elements. The generalization may, in fact, be made that the greater the grade of amentia the less is the tendency to dementia, not through a more normal durability of the former, but owing to the fact that cases of amentia so readily suffer from symptoms of mental alienation under any form of stress that as a rule little or no irreparable damage to the cortical neurones results from its influence."

Only a few of his conclusions in respect to the anatomical features of the cortex in mental disease can be given. In amentia the condition is one of sub-evolution to different degrees, in dementia the cell laminæ which have been latest developed suffer earliest. With regard to the three cortical areas investigated, marked individual variations in the thickness of the various laminæ occur in the visuo-sensory area which appear to bear no relation to the degrees of amentia or dementia which exist. Similarly, in the visuo-psychic zone there is a marked degree of individual variation in the pyramidal lamina ; this also is independent of the existing grade of dementia or amentia. But in the prefrontal region " both specialization and individual variation are practically or entirely absent, and the cortex merely exhibits degrees of sub-evolution or dissolution which vary according to the grade of amentia or dementia which exists in the individual cases. . . . That the condition is one of true sub-evolution is shown by the fact that the laminæ are sub-evolved in the order of their normal development, the last to appear being the least developed, and the first the most. The reverse order holds with regard to dissolution, the last lamina to appear during normal development being the first to undergo retrogression in dementia, and the first the last. In the case of the cortex of the prefrontal region, therefore, the associative function of the pyramidal lamina must be regarded at voluntary-associative, in view of the fact that the essential feature of amentia and dementia is decrease, instability, or loss of voluntary control over the processes of cerebral association. . . .

" There is reason to believe that this physical basis of the cerebral functions, which exhibits such well-marked variations in the subjects

of mental alienation, exhibits equally important though less extensive variations in the case of presumably normal individuals, and thus indicates the likelihood of a structural origin for individual differences in mental endowment."

Similarly, macroscopic examination leads Shaw Bolton to the conclusion that wasting of the convolutions is found to correspond very exactly to the degree of dementia. The greatest amount of wasting is in the prefrontal region. It is next most marked in the remainder of the first and second frontal convolutions, and least marked in the orbital surface of the frontal lobes, the inferio-internal aspect of the temporo-sphenoidal lobe, and the posterior pole of the hemisphere. Incidentally it may be said that he does not accept Campbell's statement that the prefrontal lobe is immature and relatively deficient in neuronic elements. He considers the prefrontal cortex of great functional significance, and that it constitutes the physical basis of the general processes of cerebral association. " It is the last region to be evolved, it is the first region to undergo dissolution in mental decadence." Shaw Bolton gives many illustrations showing the extreme complexity of the cell and fibre architecture in the prefrontal region, which he considers to exhibit a wealth of intercellular fibrils probably greater than is found in any other part of the cortex.

In order to understand Shaw Bolton's use of the term 'dementia,' it is necessary to note that he considers this to be a permanent mental deterioration arising from neuronic degeneration. He claims that this degeneration can be demonstrated both macroscopically and microscopically. This neuronic decay depends upon the direct or indirect influence of toxic agents. The clinical mental symptoms produced by this toxic influence he describes under the term 'mental confusion,' which ends either in complete recovery or in dementia, stationary or progressive. Further, the result of the attack of mental confusion depends upon the durability of the nervous structures, which differ greatly in different individuals, some resisting toxic influences, others being predisposed to decay.

An outline of the classifications adopted by Shaw Bolton based upon the generalizations already mentioned will be of interest :—

1. *Amentia.*—The mental condition of patients suffering from deficient neuronic development.

a. Low Grade. Idiocy and imbecility with or without epilepsy.

b. High Grade.

i. Excited and 'moral' cases.
ii. Recurrent cases.
iii. Hysteria.
iv. Epileptic insanity.
v. Cases with systematized delusions.

2. *Dementia.*—The mental condition of patients who suffer from a permanent psychic disability due to neuronic degeneration following insufficient durability.

a. Primary neuronic.

i. Senile or 'worn out' dementia.

ii. Presenile or 'climacteric' dementia.

iii. Mature or 'adult' dementia (chiefly from intemperance, childbirth, etc.).

iv. Premature or 'adolescent' dementia.

b. Progressive and Secondary.

i. Dementia senilis.

ii. Dementia paralytica (general paralysis).

c. Special Varieties of Dementia (following sense deprivation, cerebral lesions, etc.).

TREATMENT.—*Incipient Insanity.*—The urgent need for improved facilities for treating incipient and borderland cases of mental disorder has long been recognized in this country. In July, 1914, a special committee of the Medico-Psychological Association[2] reported *inter alia* in favour of the establishment of clinics for mental diseases in connection with universities, medical schools, and general hospitals. These should be equipped for research work in and for the treatment of mental disorders, and be available as places for undergraduate and post-graduate instruction. In addition to the treatment to be provided in clinics, the Committee recommends that voluntary boarders shall be eligible for admission into public asylums, so that the excellent accommodation in these institutions may be more readily used by persons in the early stages of the disorder. It is recommended that powers similar to those contained in the 1905 Lunacy Bill, providing for the treatment of incipient cases for a limited period, without certificates, be obtained so as to provide for the reception of 'notified' persons into public asylums, registered hospitals, and licensed houses, in addition to homes approved by the Board of Control.

In America there are several special hospitals of the kind so urgently needed in this country. One of the newest is the Psychopathic Hospital at Boston. A grant from the state of £120,000 enabled the hospital to be built, and at its first anniversary meeting the proceedings[3] showed the large amount of scientific work that had been undertaken. Channing spoke of the wonderful success of the hospital. It formerly seemed almost hopeless that any case of mental disease, no matter what the conditions might be, could find the doors of a hospital open to receive it. . . . yet already, in a few days less than a year, 1418 patients have been received, the best possible testimony that the hospital has been appreciated. The success of the out-patient department has borne further testimony in the same direction. The following is a summary of the papers setting forth the result of the year's work at this hospital.

Baker spoke of the importance of the hospital in dealing with cases of crime in juveniles. Eversole dealt with the value of voluntary commitment. Anderson gave an interesting analysis of irregularities in mental defect, 225 cases being intensively studied. Of 184 children or adolescents, 17 per cent gave a positive Wassermann reaction.

Marked defects of auditory memory were ascertained in 46 per cent, and defects of visual memory in 57 per cent. In the former the degree of feeble-mindedness was often more severe than in the latter.

Jarrett reported on the value of social service in connection with a psychopathic hospital. Of the 700 out-patients, 79 needed care and supervision at home. In addition to these, 52 in-patients were assisted by the social service department after their discharge. It is interesting to see that the hospital authorities realize that more is needed of them than treatment of patients within its walls. Lucas dealt with the incidence of syphilis as shown by the Wassermann reaction. In 74 cases of mental defect of various grades, the reaction was positive in 27 and negative in 47. Hearns discussed delirium tremens and alcoholic hallucinosis.

Gregg referred to the extreme value of continuous **Baths** and **Packs** in the treatment of delirium, and compared the results with those in general hospitals, the respective mortality being nil as against 26 per cent. The high mortality in general hospitals is attributed to the absence of proper facilities and the use of restraint and depressant drugs. Adler and Rayle studied the effect of prolonged baths upon the number of red cells in the blood, and found that after the bath they were less numerous. In one patient a period of excitement could be predicted from two to twelve hours before its onset by some degree of cyanosis and an increase in the red count. They consider the baths act as water-jackets and prevent the loss of water by evaporation.

Myerson reported the results of treatment of general paralysis by **Salvarsanized Serum.** In four cases there was some clinical improvement. In three no benefit accrued.

References.—[1]*Knowledge*, 1914, Aug.; [2]*Jour. Ment. Sci.* 1914, Oct.; [3]*Boston Med. and Surg. Jour.* 1914, i, 418.

INSOMNIA.

See the therapeutic notes on **Dial-ciba** (*p.* 9); and on **Diogenal** (*p.* 11).

INTESTINAL STASIS (Chronic). (*See* Alimentary Toxæmia and Chronic Intestinal Stasis.)

INTESTINAL SURGERY.

E. Wyllys Andrews, M.D., F.A.C.S. (Chicago).

A new form of industrial injury, *pneumatic rupture of the bowel*, has been described by Andrews, of Chicago, who reported thirteen cases. Bendixen and Blything[1] now report seven additional cases, making twenty in all on record. As noted formerly, the accident occurs from the playful use of the pneumatic tools used by workmen in 'hazing' their fellow-workmen. It has been shown that approaching the anus through the clothing, the projected jet of air, even several inches away, can suddenly distend the large intestine and rupture it. The writer's personal case was exactly like all the others reported. The patient was brought in, cyanotic and gasping, with enormously dis-

tended abdomen. Unlike many of the others, the diagnosis was made before operation, as the history was clear. The laparotomy, about two hours after the accident, showed little soiling of the peritoneum, with a considerable amount of bloody exudate ; the bowel was enormously ballooned, very little air having escaped into the free cavity. Three lacerations 2 to 4 in. in length in the descending colon were found and sutured, together with four lacerations 1 to 4 in. long in the ascending colon, and two about 2 in. in length in the ileum, 8 in. away from the cæcum, together with a 3-in. tear in the mesentery. The entire colon was much congested. The patient, like Dr. Andrews's first case, made a good recovery. Like most of the others, he had been injured by his companions, who jokingly placed a compressed air hose near but not against his rectum. This tube carried a pressure of 100 to 125 lb. Air was forced through the clothing, the patient immediately being stricken by his internal injury and unable to stand. The writers then add six other cases, or seven in all, collected from various sources.

Gray[2] reports a case of recurrent *intussusception* in a child two years and one month old. The symptoms had appeared and disappeared several times before operation. A sausage-shaped mass could be felt when the abdomen was opened, revealing a typical ileocolic intussusception. The wound healed perfectly, and good recovery followed. Six months later, the operation had to be repeated for the same condition, and this time the mobile cæcum was fixed by suture. Eight months following, the operation had again to be repeated, this time under spinal anæsthesia, to reduce the same intussusception, and again a good recovery followed. Great interest is attached to this case from the fact of the recurrence each time in a different part of the intestine.

Allen[3] reviews 27 cases of intussusception in children, the majority under one year of age, all except one being under seventeen months, the oldest three years and the youngest three months ; 17 were boys and 10 girls. No exciting cause could be found for the trouble. In 24 of the cases, a palpable mass was felt per rectum. In 3, no mass could be felt per rectum or anteriorly. Of the 27 children, 20 were operated upon and 7 were not, the operative mortality being 66 per cent, while with the non-operative treatment it was less than 50 per cent. Nevertheless, the writer thinks immediate operation is always indicated. It often happens that operation is done only after other means are exhausted, which makes statistics misleading.

Wiener[4] reports observations on *ileocæcal tuberculosis*. It has been shown by numerous observers that this is a favourite site for tuberculosis, carcinoma, actinomycosis, and other infections. The enteroperitoneal tuberculosis is the form usually found in the cæcum, often producing tumours from hyperplastic thickening of the bowel wall. Frequently this can be felt as a palpable mass, and is mistaken for acute appendicitis. Operative measures include complete intes-

tinal exclusion, ileocolostomy, and partial or complete excision of the cæcum and ileum. Twenty-seven operations from 1905 to 1909, gave a mortality of 15 per cent. Campiche, collecting 154 cases prior to 1905, found an operative mortality of 34·41 per cent.

Moore,[5] of Bristol, reports a case of *hypertrophic fibrosis* of the bowel causing chronic obstruction. This disease of the intestine was found in a hernial sac, and, as shown by accompanying figures, consists of a massive hypertrophic benign thickening of the wall of the bowel and the appendix. The part involved was resected, and the operation completed as a radical cure. (*See Fig.* 58). Analogous to this fibrous thickening is the massive induration of the colon, usually near the sigmoid, first described by Mayo, under the term diverticulitis. Erdmann[6] reports cases similar to those of Mayo, Beer, and others, in which the wall of the intestine was so much thickened as to resemble carcinoma, for which it is often mistaken at operation. Fifteen cases of this series, most of them operated on under a diagnosis of carcinoma, together with two cases reported by Ransohoff, are added to those already in the literature.

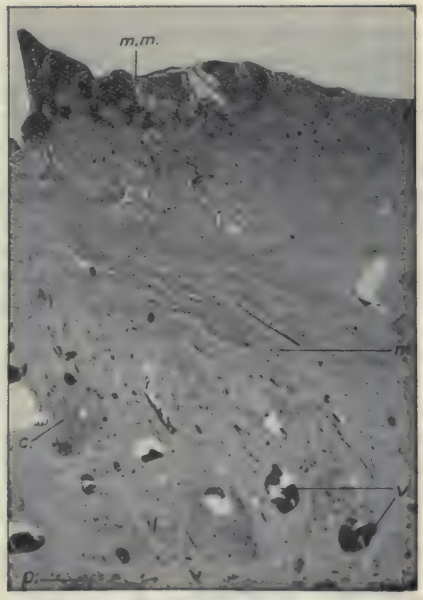


Fig. 58.—Microscopical section of the wall of the fibrosed gut seen under a low power.

m.m. = Mucous membrane; *m.* = Muscle layer; *v.* = Dilated and thrombosed vessels; *c.* = Perivascular cellular infiltration; *p.* = Subperitoneal cells. The remainder of the section is occupied by young fibrous tissue. *Illustration lent by British Journal of Surgery.*

Becker[7] reports a case of *chronic inflammatory thickening of the mesenteric glands.* The patient, who had a right inguinal hernia, showed an unusual thickening along the canal. He was operated on for strangulated hernia, and a large amount of thickened omentum was removed. Numerous lymph nodes appeared in this mass, and a general hypertrophy and enlargement. Microscopically, this proved to be a benign hyperplastic mass, like an attenuated inflammation such as sometimes appears in connective tissue under the designation woody phlegmon. Schmieden, in similar cases, attributes the trouble to traumatic obstruction disturbing the circulation. The prognosis in such omental tumours is good, as they are in no sense malignant.

Duval[8] discusses the operative technique of colon displacements and intestinal stasis. Among these measures he advocates colectomy

or removal of most of the colon after the method of Reybard, and also short-circuiting operations like those of Lane. Great value is attached to the *x*-ray diagnosis of these affections before operation. The disease may or may not be accompanied by chronic sigmoiditis, and is frequently cured by the operative measures above mentioned.

Wilkie[9] has made experimental observations on the *cause of death in acute intestinal obstruction*. Three theories are mentioned for the high mortality of these cases: (1) Secondary peritonitis; (2) Splanchnic paresis, or draining of the body fluids into the portal area, followed by cerebral anæmia; (3) Toxæmia, resulting from the absorption of poisonous products from the upper bowel. To confirm these theories, experiments were made dealing with the primary facts of simple obstruction. The bowel, in animal experiments, was ligated at various points, sometimes in two places, isolating an intestinal loop. Wilkie found that isolation of a duodenal loop which included the pancreatic- and bile-ducts disclosed a very highly toxic substance, which withstood heating at 60° C. for several hours. In each case death was due to necrosis of the duodenal wall, and a leak at the site of ligatures. In prolonging life, these experiments showed the great value of subcutaneous injections, which seemed to enable the animal to resist the toxæmia. In another series of cases, the contents of the obstructed small intestine were injected into the unobstructed small intestine of another animal. None of the animals presented symptoms referable to intoxication. Obstructing the lumen of the small intestine with a ligature plus interference with the vascular supply caused severe and intense toxæmia; but in most cases it was a peritonitis rather than a direct absorption from the mucous surface that produced the symptoms.

REFERENCES.—[1]*Surg. Gyn. and Obst.* 1914, i, 73; [2]*Lancet*, 1914, i, 746; [3]*Ann. Surg.* 1914, i, 258; [4]*Ibid.* 698; [5]*Brit. Jour. Surg.* 1914, Jan. 361; [6]*N.Y. Med. Jour.* 1914, i, 509; [7]*Berl. klin. Woch.* 1913, 1903; [8]*Rev. de Chir.* 1913, 703; [9]*Brit. Med. Jour.* 1913, ii, 1064.

JAUNDICE, EPIDEMIC. *E. W. Goodall, M.D.*

Cameron Gibson[1] furnishes a brief account of six epidemics which occurred in Cheshire during 1911-1913, and refers to a paper by Cockayne on the same subject. Gibson had the opportunity of investigating five of them personally. Cockayne's[2] paper is a very full one, and to it is appended a most comprehensive list of references. The principal conclusions to which he came are as follows: Most epidemics of jaundice (excluding jaundice due to yellow fever, relapsing fever, and malaria) can be divided into two classes: (1) Infectious jaundice, or Weil's disease; (2) Epidemic catarrhal jaundice. The former is probably due to the ingestion of contaminated food or water, or perhaps to the bite of some insect; the latter is air-borne. Infectious jaundice is limited chiefly to the regions bordering the Mediterranean sea; catarrhal jaundice occurs all over the world. Simple catarrhal jaundice is the sporadic form of epidemic jaundice; sporadic and epidemic catarrhal jaundice and acute yellow atrophy

of the liver are due in the great majority of cases to the same cause, a specific organism of unknown nature.

Besides the epidemics he investigated himself, Gibson studied the records of 40 recorded outbreaks in the United Kingdom, and of these he gives a table. He states that his investigations have led him to conclude that in this country the epidemics fall into two classes. "In by far the greater number, about 34, the incidence is almost entirely on children of school age, with an occasional adult attacked, more especially a woman; the extent of the epidemic is small, from 5 or 6 to, at the most, about 40 cases. In the second form, of which there are only four or five examples, the numbers affected are usually larger, while the age-incidence is entirely different, adults, especially between the ages of twenty and thirty, being chiefly attacked, and the number of cases under ten years of age being comparatively small." Of the 121 cases occurring in the six epidemics in Cheshire, only 6 were over fourteen years. Most of the cases occurred in November. There were no fatal cases; on the contrary, most were so mild as hardly to necessitate rest in bed. The symptoms usually come on gradually, and are, at first, headache, drowsiness, slight pyrexia, loss of appetite, and pains in the limbs, so that influenza is often diagnosed. These symptoms may increase in severity, and at the end of a week, vomiting and pain in the epigastrium or in the right hypochondrium are present. Then occur jaundice, clay-coloured stools, and bile in the urine, after which amelioration begins. In a few cases enlargement of the liver was made out, and in one case of the spleen also. In some there was a papular or macular rash. Evidence of the infectious nature of the disease was afforded by the fact that "of the 121 persons affected, 52 were single cases, the sole representatives from their respective houses; 38 were in pairs, 18 in threes, 8 in fours, and there was 1 instance of five children from the same house being attacked." It was very difficult to determine the length of the incubation period; it would seem to have been anything up to about seventeen days. There were grounds for believing that the disease was most infectious during the first week or fortnight. Bacteriological examination of the fæces and urine of some of the cases did not reveal any organisms to which the disease could be attributed. Leonard Guthrie[3] noticed that catarrhal jaundice was especially prevalent during the period of November and December, 1911, and January, 1912.

References.—[1]*Pub. Health*, 1914, Mar. 181; [2]*Quart. Jour. Med.* 1912, vi, 1; [3]*Proc. Roy. Soc. Med.* (*Sect. Child. Dis.*), vi, 48.

JOINTS, SURGICAL DISEASES OF. (*See also* Grafting; Knee Dislocations.) *F. W. Goyder, F.R.C.S.*

Mobilization of Stiff Joints.—Helferich[1] says that if the condition is associated with active disease, the primary object is to get rid of this; in such cases mobility is a secondary consideration. Interpositions of autogenous or foreign material are unnecessary in most cases if resection is sufficiently free. Juxta-articular osteotomy is frequently

preferable. In the lower limb, where weight has to be borne, interposition has been found to produce painful joints. Attempts at nearthrosis are advisable: (1) When milder measures have failed, or are not feasible; not when ankylosis has taken place in good position, lest stability be endangered. (2) In inflammatory conditions only when these have fully subsided. Should active foci be discovered at operation, mobilization should be postponed. This can always be done later without prejudice to the final result. (3) It is most suitable for fixity after injuries. (4) It is unsuitable except for patients otherwise healthy. At the hip joint, he is of opinion that Murphy's results justify interference, not only if the position be bad, but even if it be good. At the knee a good fixed position is to be aimed at. The results of mobilization at this joint are too uncertain to justify a change in methods. At a discussion on this subject[2] at the French Congress of Surgery, Denuce reported good results at the jaw, hip, and elbow. At the scapulo-humeral joint he thinks a fixed joint unsatisfactory; at the ankle he prefers resection with astragalectomy. Tubby had good results from large musculo-aponeurotic flaps. Roux found older methods satisfactory if after-treatment was persistent. Doyen did not favour complex operations. The general impression was that these methods were suitable for a few selected cases only, and that each case should be treated on its merits. Well-established methods seemed to find more favour than those at present in a state of evolution and transition.

Osgood,[3] commenting on the final results of these operations, points out that although good immediate results are not infrequent, the mobility regained is often lost later, owing to joint sensitiveness and soft-part contractures. Overgrowth of bone also occurs, and these possibilities should be explained to patients before recommending operation. He finds that grafts of chromicized pig's bladder generally gave rise to a temporary sinus, and were often extruded, without, however, prejudicing mobility. Free flaps of fascia resulted in all cases in primary union.

Brocq,[4] reviewing the treatment of ankylosis of the *knee* in bad position, insists that firm ankylosis in good position still remains the proper aim of treatment. In children he advises linear osteotomy outside the epiphysial cartilage, transverse or oblique, of femur or tibia, or both. In adolescents or adults he advocates complete resection of a periosteum-covered wedge, including the whole circumference of the bone, and rotation of this *in situ* through 180°. No special fixation is necessary. The angle of the wedge should be half that required to correct the deformity. This operation is rarely necessary if the angular deformity is less than 90°. He does not advise the use of whole joint grafts; of interposed substances he finds aponeurotic grafts the best, but considers more work on the subject is needed. Pedunculated flaps are difficult in knee-joint. Myoplasty and tendon transplantation are useful as helps to other operations in paralytic cases, but are of little use alone. Tenotomies for

over-action of muscles often result in reproduction of the deformity.

Murphy[5] finds that in all his arthroplastic work there is no operation which gives the same satisfaction to the patients as that for bony and fibrous ankylosis of the *temporo-mandibular joint*. Speaking generally of the mobilization of fixed joints, he hopes that Lexer's free fascia and fat transplantations will uphold their promise, as pedicled flaps, although most satisfactory, can seldom be got of sufficient size. He regards heteroplasties and the insertion of foreign material as doomed to disappear from the field of work.

For jaw ankylosis he makes an L-shaped cut, the vertical limb, 1½ in. long, running down to the upper border of the zygoma, along which the horizontal one is continued for ½ to ¾ in. The joint is exposed, and the deep and lateral tissues are protected by two periosteotomes of a special pattern surrounding the neck of the bone. The bone is divided at the level of the tubercle without attacking the joint. If bony ankylosis is present, ⅓ in. of neck is removed to leave room for the flap. A U-shaped flap of fat and fascia is elevated from over the temporal muscle, ¾ in. wide and 1½ in. long, its base being left attached to the upper margin of the zygoma. It is folded over the zygoma, packed into the bony gap, and sutured with catgut at its anterior and posterior basal angles to the fascia and periosteum. The wound is closed without drainage. Eight out of nine cases were completely successful. A wooden wedge should be inserted between the molars on the diseased side until the flap has healed, to prevent its compression and necrosis. It should be worn day and night for two weeks, and no attempts at opening the mouth should be made during that period, after which mastication may be permitted.

Fievez[6] points out that *intracapsular rupture of the long head of the biceps* is by no means so uncommon as is generally supposed. He found it once in every forty-five shoulder-joint cases he examined, and in no less than 10 per cent of dissecting-room subjects. It is the ultimate result of dry—chiefly rheumatoid—arthritis, which causes thickening of the tendon and often fraying, from the presence of osteophytes. Relatively slight trauma in such patients readily produces it. In many cases rupture takes place without obvious injury, coming on apparently insidiously. Since dissection proves that the tendon is seldom pulled completely out of the groove, to which it contracts fresh attachments, operation is rarely advisable. The symptoms, which sometimes lead to mistakes in diagnosis, such as rupture of the muscle, and dislocation or stretching of the tendon, are fairly characteristic. They are: (1) A tumour of the long head of the biceps, due to the unstretched belly of that muscle; (2) Abnormal palpability of the long head of the biceps on the anterior border of the deltoid; (3) Tension of this tendon when the biceps contracts. Signs of arthritis, such as creaking in other joints, help the diagnosis. The condition is most common in the middle-aged.

Brackett[7] advises the **Injection of Iodoform Oil** sufficient to distend

the joint capsule in: (1) Cases of old infection in which adhesions have been freed, and it is desirable to keep the surfaces apart; (2) Cases of (*a*) acute infection, e.g. gonococcal, (*b*) tuberculous synovitis, early cases, (*c*) chronic arthritis in selected cases.

The procedure is in no way a substitute for arthroplasty; it is not applicable to cases in which *x* rays show involvement of the articular surfaces; but is essentially for those cases only in which the abnormal condition is confined to the synovial membrane. In tubercle, the early cases naturally show the most improvement, and in these repeated injections are advocated, preferably at intervals of eight to twelve weeks. This procedure should be considered as an incident in the treatment of the tuberculous synovitis, not a substitute for the fixation and rest. Nor is permanent or absolute fixation desirable. A daily gentle passive movement, without forcing the arc of motion allowed, is decidedly a benefit, does not increase the activity of the disease, and does prevent the contraction of the capsule and formation of adhesions. Brackett claims eight cures and fourteen arrested cases out of thirty cases of tubercle. In Group 1, in which the object is largely mechanical, the motion is begun early, within the first two or three days, but never with violence, or even to the point of causing pain. In (*a*) and (*c*) of Group 2, motion is also begun on the third or fourth day, and given once or twice daily. After two weeks the leg is put on a split plaster, and locomotion allowed without weight-bearing. The author advocates open operation followed by tight stitching of the capsule, and describes the technique he adopts for the knee-joint.

Rushton Parker[8] describes a simple *splint for flail elbow*, useful also for pseudarthrosis near the elbow-joint. It consists of a moulded circular leather tube surrounding the humerus and passing well below the joint at the back to prevent extension. Laterally, it reaches low enough to prevent lateral movement, while it is cut away in front so as not to interfere with flexion. It is fixed by two straps and buckles.

Mobilization for Stiff and Crippled Hip Joint from Traumatic Arthritis.—Handley[9] describes a further case of cheilotomy for this condition, most successful both for relief of pain and restoration of function. Abduction and rotation were limited, owing to lipping of the femoral head and of the acetabulum, following a crush of the left hip due to a fall with a horse. The hip was approached by Kocher's posterior incision, and the buttresses at the upper posterior and anterior aspects of the head of the femur were removed piece by piece. The patient ultimately became able to ride without difficulty or pain.

REFERENCES.—[1]*Münch. med. Woch.* 1913, 2769; [2]*Rev. de Chir.* 1913, ii, 684; [3]*Surg. Gyn. and Obst.* 1913, ii, 664; [4]*Rev. de Chir.* 1913, ii, 772; [5]*Jour. Amer. Med. Assoc.* 1914, i, 1783; [6]*Arch. Gén. de Chir.* 1914, 129; [7]*Boston Med. and Surg. Jour.* 1914, i, 873; [8]*Brit. Med. Jour.* 1913, ii, 1431; [9]*Lancet*, 1914, ii, 87.

JOINTS, TUBERCULOSIS OF. (*See* TUBERCULOSIS, SURGICAL.)

KALA-AZAR. (*See* LEISHMANIASIS.)

KERATODERMIA BLENORRHAGICA.

(*Vol.* 1914, *p.* 310)—This is a rare and intractable dermatosis associated with gonorrhœa. In one case improvement followed the application of **Formaldehyde Baths.**

KIDNEY, FUNCTIONAL CAPACITY OF. *Francis D. Boyd, M.D.*
John D. Comrie, M.D.

In order to estimate the functional capacity of the kidneys, McCaskey[1] advises the administration of *preformed urea* by the mouth. Being readily soluble and entirely non-toxic, it can easily be absorbed from the digestive tract in quantities, the prompt elimination of which may be beyond the capacity of the kidneys, or at least beyond any physiological requirement. In this way a reliable estimate may be got of the capacity of the kidneys to excrete what is apparently the most important end-product of nitrogenous metabolism. The observation is carried out as follows : About 6 a.m. the bladder is emptied. Two hours later the urine is collected, and at the same time the patient is given 30 grams of urea dissolved in 4 or 5 oz. of water. Just before taking the urea, the patient drinks one-half of about 6 oz. of thin cereal gruel, taking the other half immediately after the urea, and no other breakfast. The urine is then collected every two hours for twelve to twenty-four hours, the urea determined in every two-hour period, including that preceding the ingestion of the urea, and from these data the curve of excretion is constructed. It is not necessary to secure an exact nitrogen balance. With an ordinary diet, the urea output from 6 to 8 a.m., fourteen to sixteen hours after the last food taken, is too small to confuse the findings in any way. Unless the quantity of protein food ingested during the preceding day is excessive, the exogenous urea will have been all, or nearly all, excreted by that time. A fairly low—e.g., 50 grams—protein intake for the day preceding and the day of the test meets every requirement. The author's results are given in curves. The entire curve for twelve to twenty-four hours often presents interesting fluctuations, the significance of which is at present not always clear. For clinical study one should note : (1) The highest bi-hourly output, which seems to vary in health from 5 to 10 grams ; (2) The total output in twelve hours ; (3) The general character of the excretion curve. The period of highest excretion should be either the first or second two-hour period. If later, it may be due to delayed absorption or a slow response on the part of the kidneys. The standard of normal excretion cannot be made absolute ; we can only determine the range of health which after the ingestion of 30 grams urea, seems to be 5 to 10 grams for the highest two-hourly period, with a total excretion for the first twelve hours of 20 to 30 grams. Cases with an excretion much below 20 grams should be regarded as of limited functional capacity, while 10 grams represents dangerous impairment of function.

McCaskey concludes that : (1) It is now fully established that the functional impairment of the kidneys may be limited, or at least more

marked, with reference to certain classes of waste products. There may be, e.g. (and these are the most important groups) varying degrees of renal block for urea, chlorides, or water. (2) This makes it extremely important from a therapeutic point of view to differentiate between the various types of renal block, because the dietetic treatment of chronic kidney disease, by far its most important phase, can be intelligently directed only with full knowledge of this differentiation. (3) This cannot possibly be made by routine laboratory methods or by the phenolsulphonephthalein test, because there is no parallelism between the capacity of the kidneys to eliminate phthalein on the one hand and urea on the other. (4) It can best be determined by surcharging the blood with the different substances in question and determining the rate of excretion of each, first over a brief period of time, while the blood remains heavily surcharged, and again over a longer period to determine the duration of time required to depurate the blood of a morbid excess. (5) The permeability of the kidneys for urea can be determined with great accuracy, in the absence of marked gastric stasis, by the ingestion of 30 grams of urea, according to the method described in this communication, and furnishes a scientific basis for the regulation of the protein intake. (6) While this method is easily within the reach of any physician who can make a determination of urea by the simple and inexpensive Doremus apparatus, which is sufficiently accurate for such an investigation, yet it is too laborious and time-consuming to be used as a routine method (for which the phthalein test is sufficient), but has a very high value in properly selected cases in which, especially for therapeutic purposes, it is advantageous to know the type of renal block present. (7) The capacity of the kidneys for chloride and water excretion can, and in suitable cases should, be determined by similar methods, although the interpretation would be much more complex.

Ware,[2] discussing the efficiency of the *phenolsulphonephthalein test*, advances the view that the efficiency claimed for the drug because of its rapid elimination and its reappearance in an unaltered form cannot bespeak any elaboration in the sense of work done on the part of the kidney, for this is denied by the very definition of efficiency which represents the ratio of useful work to energy expended. The interpretation of the colorimetric reaction is the issue. He claims that evidence favours its being an acido-metric test without any parallelism existing between the degree of acidity and the kidney function.

The *diastatic test* first introduced by Wohlgemuth[3] has been elaborated by Brown, who shows that the total daily output in urine is fairly constant. For the technique, which is somewhat elaborate, the student is referred to the original paper. In the majority of cases of renal disease, diastatic activity is present ; but no constant and definite relationship between diastatic activity and true renal function, as shown by phthalein and clinical findings, exists. Where,

however, a complete absence of diastase in the urine occurs, it appears to indicate a bad prognosis.

Discussing the tests for retention, Rowntree, Geraghty, and Marshall[4] accept a figure of 0·5 gram per litre for the total incoagulable nitrogen of the blood—60 for the freezing point. Evidences of retention greater than this they refer to as cumulative phenomena. In nine cases where cumulative phenomena occurred, renal function was seriously involved, as indicated by phthalein, and the general clinical conditions. They find that urea determination is a better index to the renal condition than cryoscopy. In no instance was a normal blood urea associated with marked decrease in the phthalein. From a consideration of the data given, they hold that their previous claims in relation to the phthalein test were well founded. In no instance were its findings incompatible with the clinical condition and subsequent history. Corroborative evidence only was adduced from the employment of the other tests, particularly valuable in this connection being the presence of cumulative phenomena. These do not occur in the presence of good renal functional capacity, and consequently the tests are unnecessary where the phthalein is normal.

References.—[1]*Med. Rec.* 1914, i, 507 ; [2]*N.Y. Med. Jour.* 1914, i, 416 ; [3]*Zeits. f. Urol.* 1911, 801 ; [4]*Surg. Gyn. and Obst.* 1914, i, 196.

KIDNEY, MOVABLE.

Francis D. Boyd, M.D.
John D. Comrie, M.D.

Monod[1] points out that the modern school of Vichy holds that movable kidney is not a disease but a symptom. These patients suffer from ill-defined dyspeptic symptoms, invariably referred to the mesogastric region, from weakness, insomnia, and constipation, which no tonics, sedatives, or laxatives relieve. The abdomen is flabby, the pulsating aorta is palpable, and lying across the vessel the 'procédé de glissement' may reveal a stretched cord which is a stenosed transverse colon. On the right side may be felt the distended and roll-shaped cæcum. The right kidney can be easily felt. Clinically, relief is obtained in these cases by support of the abdomen, but the whole abdomen must be supported. Enteroptosis is a malady of nutrition. The subjective symptoms are general weakness, intestinal troubles, and disturbance of sleep, all of which are periodic in appearance, closely following the periodicity of meals. The symptoms are aggravated by the ingestion of acids, of fats, and more particularly of milk. The most conspicuous objective symptoms are a delimitable and palpable cæcum, the great relief which mechanical support of the abdomen gives, and very often a movable kidney. The latter is nothing more than an epiphenomenon. Surgical treatment is to be wholly condemned. It is based upon an error of pathology, and is like amputating a leg to cure sciatica, or operating on a syphilitic strabismus. The treatment of nephroptosis is the treatment of enteroptosis : (1) A **Belt** ; (2) Free action of the

bowels, preferably with **Salines**; (3) A **Diet** principally of meat; (4) **Sodium Bicarbonate**, which may be prescribed as Vichy water. [Improvement in the contractile power of the muscles which can be produced by the coarse wire primary coil with slow intermissions, is the essential curative agent in such cases.—Ed. M. A.]

Reference.—[1]*Pract.* 1913, ii, 675.

KIDNEY, SURGERY OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Infantile Kidney.—A type not usually included in descriptions of the varieties of kidney anomalies is described by Geraghty and Plaggemeyer.[1] On one side there is a large hypertrophied kidney, and on the other an infantile kidney, the urine from which is normal chemically and microscopically, but the quantity of urine is small, and the function so limited that this kidney alone may be insufficient for life. On examination, the organ is normal in shape, colour, consistency, and microscopical structure. It differs from the normal kidney only in its diminutive size. L. L. McArthur describes such a case, where the large kidney was removed for tuberculosis, and death from renal insufficiency followed. The ureters in this case had been catheterized previous to operation, and a clear, apparently normal, urine obtained from the insufficient kidney. Geraghty and Plaggemeyer discuss the diagnostic points of the condition. Where disease is present in the hypertrophied kidney, the total function, estimated by phenolsulphonephthalein, is decreased, and the function of the diseased kidney is usually greater than that of the supposed healthy one. The function of the infantile kidney shows marked decrease, although the urea percentage and general character of the urine are normal. Pyelography is of doubtful value. The outline of the kidney on an *x*-ray plate may be shown to be small.

Incrustations of the Renal Pelvis and Ureter.—Caulk,[2] describing four cases, says: the majority of observers agree that the essential process in calcareous infiltration is necrosis. The deposition of salts in the damaged cells and tissues probably takes place from a urine hypersaturated from a special diathesis. In one case, however, the author is undecided whether the necrotic pelvic wall was secondary to the calcareous infiltration, or whether the changes in the pelvic wall were primary, and responsible for the deposit. Treatment depends upon the position. Incrustations around the papillæ, or in the renal pelvis, should be removed by nephrotomy, the ureteropelvic junction being blocked to prevent particles descending to the bladder. The pelvis should be thoroughly irrigated, and should be injected with **Argyrol** several times during the first few months. In incrustation of the ureter the author prefers removal by means of the catheter to opening the ureter by operation.

Renal Sarcoma of Infancy.—Loughnane[3] collected 35 cases from the records of the London hospitals with the object of showing that operations are occasionally successful. The longest survivals of nephrectomy are, one patient fourteen years, and two patients well ten years after operation. The prognosis, he admits, is decidedly

unfavourable. Recurrences are said to take place in 80 per cent, and in over 70 per cent within the first year. According to Wagner, permanent cures of from two to eighteen years have been recorded in 34 cases; of these, 21 have passed the three-year limit. In the cases collected by Loughnane, the immediate result of operation was the following: 13 nephrectomies with one death (7·7 per cent); 7 exploratory operations with 2 deaths (28 per cent); deaths without operation, 8. The late results were as follows: of 12 surviving cases of nephrectomy, 2 died in six months from recurrence; 4 survived three years; in 3 the results are unknown; 1 died of phthisis three months after operation, and 2 were alive and healthy one and six months later respectively. Thus 33⅓ per cent survived operation three years, and 25 per cent ten years.

Nephroptosis.—A pathologically movable kidney is defined by W Billington[4] as "one the position of which is affected by influences other than respiration, and in particular by gravity." Two tests are applied to ascertain if pathological mobility is present: (1) Is the level of the kidney influenced by gravity? (2) Can the kidney be pushed to a higher level, and can it be prevented from ascending during expiration by grasping its lower pole? Heredity, he regards as an important factor in etiology, and muscular overstrain is the most important direct cause. The modern tendency for growing girls to take part in active games, such as hockey, tennis, etc., is, he holds, responsible for many loose kidneys. Childbearing is a cause of general visceroptosis rather than nephroptosis alone.

In order to obtain full information, the patient must be examined both standing up and lying down. The author favours the method of grasping the loin with one hand, while the other hand is free to palpate the abdomen. When the kidney is movable, the loin is softer and feels empty, and percussion over the renal area posteriorly gives a resonant note. Where rotation of the kidney without downward displacement is suspected, it may be impossible to palpate the organ. A diagnosis must here be made on symptoms, the signs enumerated, and evidence be given in the urine of interference with the renal function. The author distinguishes five groups, according to the symptomatology: (1) The symptoms are local and definitely related to the kidney; (2) The symptoms are due to "functional disturbances of the sexual organs." In women these are dysmenorrhœa, amenorrhœa, menorrhagia, and metrorrhagia, and it is interesting to note that the author also includes in this category persistent leucorrhœa; (3) Chronic functional disturbances of digestion; (4) Spinal and cerebral neurasthenia; (5) Mental derangement.

K. M. Pardhy[5] explains the occurrence of mental disorders in cases of movable kidney as resulting from a toxæmia. This toxæmia, he holds, is produced by: (1) Deficient excretion of some waste products in the blood-stream; (2) Interference with the formation of the internal secretion of the kidney; (3) Possible formation of a perverted internal secretion; (4) Kinking of the ureter, with stasis

of urine and production of hydronephrosis, and decomposition of the stagnant urine. The author claims cures of 80 per cent of cases of mental disorder with nephroptosis by means of **Nephropexy.** "The time taken by patients for a complete cure after nephropexy varies from a few months to a year or more, and it is essential that during this period the patient is properly taken care of, that physical and mental over-exertion is avoided, and treatment is carried out on the lines usual in mental cases." The author states that " the patients' psychic symptoms are worse immediately after nephropexy, and sometimes they remain so for a few weeks or longer " ; and, again, " when nephropexy has technically failed, i.e. when the kidneys have become loose again, or have been fixed too low or in a wrong axis and position, the patients have derived no benefit ; in fact, the majority of them are made worse." A much more moderate estimate of the effect of nephropexy in this class of cases is given by Billington : " I wish to emphasize the fact that nephropexy does not cure the patient except when performed for purely local symptoms ; it only makes it possible for recovery to take place."

In discussing movable kidney, Fowler[6] holds that the lower calices are improperly drained even in the normal position of the kidney. He therefore carries out an operation of nephropexy by which the kidney is rotated upon its anteroposterior axis, so that the upper pole is drawn inward and downward, and the lower pole outward and upward, the lower calix being thus on a level with or beyond, the upper calix. When in the upright position, the urine would have a downward gravity flow from the lower as well as from the upper pole. To support the organ in this position Fowler uses strips of fascia lata. An assistant removes a strip of fascia one inch wide and eleven inches long from the outer aspect of the thigh. This is split so as to produce two strips. A series of incisions is now made through the capsule round the kidney at the junction of the upper and lower poles with the middle third. The capsule is raised between these, and the fascial strips are woven through them, leaving the ends free. The strips are brought out through the muscles of the back, that round the upper pole close to the spine, and that round the lower, above or below the last rib. The kidney is fixed in a nearly transverse position.

In a discussion at the Royal Society of Medicine on nephropexy and its results, G. Percival Mills[7] gave the following results in a series of cases operated on by various surgeons in the General Hospital, Birmingham :—

	Fixed high	Fixed low	Relapsed
	per cent	per cent	per cent
1. All cases	53	23	23
2. Fixation to rib and capsular suspension sutures ..	73	0	26
3. Suspension sutures only ..	62	12	25
4. Suture to muscles of loin ..	12	75	12

The author stated that the advantage of the operations (2) and (3) was obvious from these figures, for though (4) showed fewest relapses, it usually resulted in a low fixation associated with a bad functional result. The great majority of the relapses occurred during the first two years. The functional results tabulated from statements by patients were as follows: Gross results (57 cases), 33 per cent cured; cases with lumbar pain only (34), 50 per cent cured; cases of lumbar pain and dyspepsia or some neurosis (21 cases), 9 per cent cured; cases of uncomplicated lumbar pain relieved by horizontal rest (20 cases), 75 per cent cured; cases of uncomplicated lumbar pain unrelieved by horizontal rest (10 cases), none cured.

The following were his conclusions: (1) The general results of nephropexy were bad; (2) It had frequently been performed to relieve symptoms that were not due to movable kidney, and those symptoms persisted after a mechanically successful operation; (3) The symptoms due to a movable kidney were chronic lumbar renal pain, relieved only by horizontal rest. These symptoms, if present alone, were nearly always cured by nephropexy; (4) When lumbar pain was associated with neurotic symptoms, nephropexy rarely gave relief; (5) Nephropexy failed to cure cases of dyspepsia, which was supposed to be due to obstruction of the duodenum by a right movable kidney; (6) The following were the indications for nephropexy: (*a*) intermittent hydronephrosis; (*b*) pain of character described; (*c*) a few cases of Glénard's disease.

Thomson Walker said there was no other operation where the results depended so closely upon the proper selection of cases. Apart from those where no symptoms were present, and where everyone agreed the movable kidney should be left alone, there were two classes: (1) Those whose symptoms were directly connected with the kidney, such as renal pain, hæmaturia, casts, albumin; (2) Those in which there were symptoms not directly connected with the kidney; these included: (*a*) gastro-intestinal symptoms, and (*b*) nervous symptoms.

In the first class of cases operation should be performed, and the results, if the operation was mechanically successful, were uniformly good. In the second class with gastro-intestinal symptoms, there were frequently extensive adhesions round the cæcum and colon. The cases in this class that were likely to do well after nephropexy were those that were benefited by rest in bed and were made worse by exercise. The results in cases of neurasthenia were very unsatisfactory. The rest test was not so reliable in this class.

In regard to the method, the majority of operations now performed did not completely fix the kidney, and if movement was permitted, there was no method of controlling it, or preventing movement from taking place in some unexpected direction. He fixed the decapsulated posterior surface of the kidney on the carefully denuded muscles of the posterior abdominal wall. The anterior surface was not stripped, as it would adhere to the bowel. The evidence produced to show

that a low position of fixation was the cause of failure, was of the most flimsy character. So long as there was no dragging of the vascular pedicle, and no twisting or other obstruction of the ureter, and the kidney lay internal to the outer border of the quadratus lumborum, there was no reason to believe that a low position would cause symptoms.

Gardiner presented the statistics of cases operated upon at Guy's Hospital for four years (1909–12). There were 26 operations ; 21 patients were relieved ; 5 were not completely relieved. The results were only those within six weeks of the operation. Blakeway gave the results obtained at St. Bartholomew's Hospital during the same period. There were 62 cases, 59 female and 3 male. There were two bilateral operations. There was one fatal case (chronic interstitial pneumonia) ; and 26 were not traced. The results were satisfactory in 22, unsatisfactory in 12, and successful on one side in 1. Of 14 cases examined, 6 were satisfactory as regards symptoms, but in 2 of these the kidney was still mobile ; 8 were unsatisfactory. Johnson read statistics from St. Thomas's and St. George's Hospitals for the same period. At St. Thomas's Hospital 53 had been operated upon ; 32 of these had replied to inquiries as follows : good 16, fair 4, poor 2, temporary relief 1, failure 9. At St. George's Hospital 24 patients had been operated on, but only 8 were traced ; of these, 3 were worse, 1 was unchanged, 3 were slightly improved, and only 1 completely recovered. The kidney had remained absolutely fixed in only one case.

Technique of Kidney Operations.—Bazy[8] holds that the usual lumbar incision is insufficient for proper exposure of the renal pedicle. Chevassu and other surgeons have preferred a lateral paraperitoneal incision, which is more satisfactory. This has a wide application, and is easily carried out, but it cuts the internal oblique muscle parallel to its fibres, and this forms a band-resisting retraction. Further, the nerves of the abdominal wall are cut as in the oblique incisions. The author suggests an incision wholly situated on the anterior abdominal wall. It commences a little below the tip of the eleventh rib, and passes towards the median line, which it does not reach, and ends on a level about midway between the umbilicus and the xiphisternum. The peritoneum is pushed on one side and the perirenal fascia opened. The approach to the pedicle is greatly facilitated by this operation. According to the author's views, operations concerned with the convexity of the kidney, such as nephropexy and nephrotomy, should be performed by the lumbar approach, while those necessitating easy access to the pedicle should be carried out by the transverse anterior abdominal incision.

Vincent[9] has introduced an air cushion for kidney operations. The Edebohls cylindrical kidney-cushion has two faults, namely, a tendency to slip out sidewise, and the fact that it could not be used fully inflated except in patients of approximately normal abdominal contour ; hence the pressure on the abdomen was diffuse instead of

localized. The patient is insecurely balanced, and the cushion has frequently to be adjusted during the operation. Vincent's cushion is triangular and divided into two compartments, an upper and a lower, each with inflation tubes 30 in. long.

W. J. Mayo[10] refers to three cases of accidental injury to the descending portion of the duodenum during removal of the right kidney. The injury took place during attempts to check hæmorrhage, and probably all were due to forceps. In these cases the accident was fatal. The duodenum overlies the pedicle of the right kidney and a considerable portion of the inner side of the lower half of that organ. The vena cava is similarly wounded even more frequently than the duodenum. These injuries are liable to occur in two classes of cases. When fixation and shortening of the pedicle take place as the result of inflammation (pyonephrosis and secondary nephrectomy), the attempt to remove the kidney in the ordinary manner renders accidents in securing the pedicle not infrequent. Nephrectomy in such cases should be subcapsular. In the removal of carcinoma of the pelvis of the kidney, injuries to the duodenum and vena cava are most liable to occur. Nephrectomy for large tumours of this description should be transperitoneal, the lumbar incision being brought well forward towards the middle line and, if necessary, supplemented by a straight incision in the right rectus muscle or a long transperitoneal incision at the outer border of the rectus muscle. When the accidental injury to the duodenum has occurred, the fistula does not heal spontaneously ; the gastric, intestinal, pancreatic, and biliary secretion rapidly enlarge the opening, irritate the skin, and exhaust the patient. A transperitoneal attack on the fistula should be made, the second part of the duodenum lifted from its bed, the opening sutured, a flap of peritoneum or omentum transplanted across the suture line, and a jejunostomy made for temporary feeding purposes.

The untoward results of nephrolithotomy are discussed by Krotoszyner.[11] Of these, hæmorrhage is the chief. Hæmorrhage occurring during the operation is a very serious event, which has not infrequently necessitated immediate nephrectomy of an otherwise intact kidney. Post-operative hæmorrhage may rarely occur a few hours after operation. A few such cases have been recorded, with a high percentage of fatal results. The cause of post-operative hæmorrhage is abscess, according to this author. It is suggested that distention of the renal pelvis, and separation of the cut surfaces of the kidney, may result from blocking of the ureter with clot. Tamponage of the kidney has been successful, but nephrectomy is considered the safest method. Perirenal infection and septic nephritis may follow infection derived from the kidney. It may spread to the peritoneum and cause meteorism. Fistula may follow nephrolithotomy in an infected kidney. This is due to imperfect drainage. Pyelotomy should be preferred to nephrolithotomy whenever it is possible.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1913, ii, 2224 ; [2]*Surg. Gyn. and Obst.* 1914, i, 497 ; [3]*Brit. Jour. Surg.* 1914, July, 77 ; [4]*Clin. Jour.* 1913, Oct.

401, and *Brit. Med. Jour.* 1914, i, 856 ; [5]*Pract.* 1914, i, 527 ; [6]*Jour. Amer. Med. Assoc.* 1914, i, 367 ; [7]*Lancet*, 1914, i, 243 ; [8]*Presse Méd.* 1914, 186 ; [9]*Med. Rec.* 1913, ii, 1035 ; [10]*Jour. Amer. Med. Assoc.* 1914, i, 343 ; [11]*Ibid.* 1913, ii, 1688.

KIDNEY, TUBERCULOSIS OF.

Francis D. Boyd, M.D.
John D. Comrie, M.D.

It is only within recent years that tuberculosis of the kidney has been recognized as a pathological entity which arises independently of other tuberculous affections in the genito-urinary system, and which, in the earlier stages at least, offers excellent prospects of recovery. Until quite recently it has been regarded either as a terminal manifestation of general tuberculosis, or as a rare disease whose diagnosis was difficult or impossible. Contrary to the general opinion previously held, it is now considered that tuberculous cystitis is usually secondary to kidney tuberculosis, and not its cause.

Diagnosis.—Keene and Laird[1] differentiate certain forms which produce different symptoms and signs. There is first of all the type in which an eruption of tubercles has occurred diffusely throughout the kidney, producing not so much a tendency to caseation as to fibrous-tissue formation, and so transforming the kidney into a dense irregular mass in which, if areas of softening be present, these latter become impregnated with lime salts. The commonest type is that in which one or more caseating cavities form at the junction of cortex and medulla, and not infrequently at one or other pole ; these may or may not communicate with the pelvis, and in any case the intervening kidney tissue shows advanced interstitial nephritis. A much rarer type is that in which the renal papillæ are ulcerated, presumably owing to the passage of tubercle bacilli along the renal tubules and their lodgement in the papillæ. The fourth type is the terminal pyonephrosis in which any of these may result, with breaking down of all the kidney tissue and the formation of a large pus sac. The changes in the ureter are of great importance, amounting in some cases only to a few scattered tubercles, while in other older-standing cases there is great thickening of the tube, so that it can be palpated through rectum or vagina. As the result of a study of twenty-five cases of renal tuberculosis, these writers attach importance to the following signs and symptoms for early diagnosis : Dysuria, which may vary in degree from painless polyuria to severe strangury, and which is not necessarily a sign of any involvement of the bladder, but probably of reflex origin. Rise of temperature is usually not present, but if so may only occur towards evening. Pyuria, it may be to a very slight extent or of fluctuating amount, is almost always present except in the earliest cases limited to a small abscess in the renal cortex. Albuminuria is present, but macroscopic hæmorrhage is rare except in cases where the renal papillæ are affected. Tenderness at the costo-vertebral angle is usual, and thickening of the ureter as palpated by vagina or rectum is of the greatest value in diagnosis as to which kidney is affected. The tuberculin reaction is not of much

value. Functional kidney tests, *x*-ray examination, and above all the cystoscope, give information of the greatest possible value in determining the position and extent of the lesion. Finally, the examination of the urine for tubercle bacilli is of great importance, and may include the preparation and staining of films from a centrifuged specimen of urine, and also the injection of guinea-pigs, preferably, according to these writers, following the Bloch glandular technique, which gives a positive result in 77 per cent of cases.

In papers dealing with this subject, Newman[2] gives the signs shown by the cystoscope in renal and vesical tuberculosis. He enunciates four axioms in regard to early diagnosis : (1) When the orifice of the ureter is strictly normal, no serious disease exists in the corresponding kidney ; (2) When the kidney is normal, the orifice of the ureter is also normal ; (3) When there is evidence of tuberculosis at the orifice of the ureter, there is always associated with it tuberculosis of the corresponding kidney ; (4) In tuberculosis of the bladder, the ureter does not become involved if the corresponding kidney is free from disease.

At the International Medical Congress,[3] much the same conclusions were stated as above. Professor Rochet was of opinion that an early lesion capable of setting up irritative symptoms might still, as in other organs, heal, and should be treated otherwise than by surgical intervention. When, however, pyuria, definite diminution of the functional value of the diseased kidney, and such symptoms as repeated hæmaturia, pyrexia, anæmia, or bladder involvement had appeared, the time had come for nephrectomy. Wildbolz, giving his experience of 300 cases, had found that, in 70 to 80 per cent of these, tubercle bacilli were found in centrifugalized urine, though inoculation was a surer test ; he considered that as soon as unilateral tuberculous disease had been diagnosed, the kidney should be removed.

With regard to progress after nephrectomy, O'Neil and Hawes[4] traced 24 cases for several years subsequently, the longest period being six years ; 4 cases were found to have died of tuberculosis elsewhere ; all the others showed marked improvement, with gain in weight, and, except in 3, there was ability for hard work. In some of these cases the frequency of micturition, though relieved, still persisted to some extent.

A closed form of renal tuberculosis in which all the symptoms of chronic Bright's disease, including cardiovascular symptoms, are present, is described by Bret and Blanc-Perducet[5] as not uncommon. In these cases the isolated tuberculous foci are accompanied by a process of advanced interstitial fibrosis in the kidney. As a rule, the condition cannot be diagnosed at an early stage, and it is doubtful if these cases are suitable for operation at a later stage.

References.—[1]*Amer. Jour. Med. Sci.* 1913, ii, 352 ; [2]*Glasgow Med. Jour.* 1913, ii, 241 ; [3]*Brit. Med. Jour.* 1913, ii, 449 ; [4]*Boston Med. and Surg. Jour.* 1913, ii, 492 ; [5]*Rev. de Méd.* 1913, 833.

KNEE, INTERNAL DERANGEMENTS OF. *F. W. Goyder, F.R.C.S.*

At a discussion held at the annual meeting of the British Medical Association in 1913 on the diagnosis and treatment of injuries of the knee-joint, attention was paid to the conditions under which tearing of the internal semilunar cartilage took place. Martin[1] believed that rupture occurred when the bent knee was suddenly and forcibly twisted ; Walton, however, held that forcible extension alone was the cause ; Hey Groves, Finck, and Cotterill thought that sudden extension of the flexed knee-joint with the leg internally rotated was the usual cause. With this Robinson[2] agrees, and advances a most convincing explanation of the mechanism of production. He points out that by contraction of the quadriceps with the leg straight, the patella may be fractured, but the cartilage is never torn. Many of the speakers had dealt with the condition in miners, who are very subject to it, and rarely able at their work to extend the leg fully. Other interesting points arose in this discussion : Martin finds that forcible hyperextension resulting in rupture of the crucial ligaments gives a good result by splinting for three months in the slightly flexed position ; rupture of the internal lateral ligament gives a weak joint if treated by splints ; rupture of the ligamentum patellæ may result from sudden and forcible flexion of the knee-joint, and is best treated by open operation. Abnormal hyperextension is best treated by a knee brace ; loose bodies should be transfixed before attempting their removal. Traumatic osteo-arthritis he regarded as rare, as was also the hypertrophied synovial fringe in osteo-arthritis. Chad Woodward, considering the treatment of chronic synovitis, said the joint must first be emptied. Usually a few days of massage and firm elastic pressure sufficed to effect this ; if not, aspiration was to be performed. Exercise and massage should then be systematically undertaken. In a week or two, the knee should be firmly strapped, and the patient allowed to go about as usual. As to the technique in operation for semilunar cartilage, many operators preferred the transverse incision, a few the vertical one. Interrupted sutures in layers were better than continuous ones ; drainage should not be employed. Cartilages split lengthwise might remain attached at each end, and the central portion recede into the joint. Occasionally they tore the articular cartilage of the femur. No splint should be used, and early active movement should be encouraged.

Spencer Mort[3] points out that extra-articular conditions, such as the tendon of the sartorius riding over a distinctly lipped portion of the femoral condyle in a rheumatoid patient, were at times mistaken for ruptured semilunar cartilage. Hence, in elderly patients it was always wise to look for rheumatoid conditions even when a history of injury was given.

Robert Jones[4] says the most frequent cause of the displacement is strain thrown on the internal lateral ligament when the knee is flexed and the tibia rotated outwards ; rarely while the knee is fully extended. If an injured semilunar is rationally treated after its

initial displacement, it stands a good chance of being completely cured. Reduction must be absolute; all movements of the cartilage must be prevented until union of the torn structures is complete; and no lateral strain must be allowed until the lateral ligament, so often injured, has had time to effect a recovery. If no anæsthetic be used, the patient can help in the reduction of the displacement. The knee is fully flexed and internally rotated. The patient is then told at a given signal to extend his own knee while the surgeon assists by pressure from above. The patient always knows when reduction is complete. If the knee does not voluntarily remain completely extended, the displacement is not corrected. Complete rest in full extension for four or five weeks is necessary. Synovitis is invariable. Locking is the most definite and reliable symptom, and unless it occurs an element of doubt must always remain. A knee which has been the seat of trauma is very susceptible to infection; hence operation should be avoided when effusion is present. It is most convenient to operate with the limb hanging in flexion over the end of the table. A 1½-in. incision is long enough, and the internal lateral ligament need not be divided. It is only necessary to remove the loose portion of cartilage if the remainder be firmly attached. A tourniquet is used; no vessels are tied, and the wound is not drained. Many foreign bodies are best removed through a posterior vertical incision to the inner side of the popliteal vessels.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 1070; [2]*Ibid.* 1914, i, 133; [3]*Ibid.* 136; [4]*Lancet*, 1914, ii, 297.

LABOUR. *Bryden Glendining, M.S., F.R.C.S.*

Placenta Prævia.—Hingston[1] reviews the cases occurring in the Madras Hospital during ten years. The paper is interesting, as showing the different results in Eurasians and Europeans as compared with Indians. Thus, all the deaths that occurred were in Indians, which is readily explained by the delay in seeking advice. The percentage of European children surviving is greater than the Indian. Placenta prævia appears to be more common among Europeans and Eurasians. Finally, it is found that the cases occurring in the ninth month do better than those in the previous months.

Cæsarean Section is now strongly advocated in certain cases of placenta prævia. McPherson[2] gives the results of nineteen cases operated upon in the New York Lying-in Hospital, where the operation was undertaken for rapid delivery for severe hæmorrhage. One mother died, and the fœtal mortality was 26 per cent. This maternal death was due to septicæmia on the twenty-first day, indicating that the method of delivery was scarcely to be blamed. He concludes that Cæsarean section offers a better chance of saving the life of the mother and child, with fewer complications, always provided that it is done by an experienced and competent operator under suitable conditions.

Eclampsia.—Two papers in the year's literature, both by the same author, Reuben Peterson,[3 4] are devoted to the place of **Cæsarean**

Section as a treatment of eclampsia. The one[3] gives in detail all the information and statistical results of 500 collected cases. The paper treats of the subject in all aspects, in relation to duration and number of fits, period of gestation, maternal and fœtal mortality, and the various operative measures, and concludes with an exhaustive bibliography. It is an important monograph. The second paper,[4] on the role of Cæsarean section, presents the results in more generalized statements, so that some of the conclusions may well be cited. First, the mortality for all cases of Cæsarean section in eclampsia during the last five years is now 25 per cent ; and when it is remembered that Cæsarean section is resorted to by the majority of obstetricians only when the outlook is serious, this result compares very favourably with the mortality of 20 to 25 per cent which is that of ordinary routine treatment. The mortality for cases of Cæsarean section in eclampsia before 1908 was 47 per cent, so that considerable progress has been made in this period ; in 42 cases operated on by five different operators the mortality was only 9 per cent ; but this figure is certainly exceptional and not likely to be repeated.

As indicating the importance of the duration of time before operation, Olin is quoted as stating that in 31 cases delivered one to three hours after the onset of the first convulsion, the mortality was 3 per cent, while in 50 cases six to twenty-four hours after the first convulsion the mortality was 28 per cent. Again, in 30 cases operated on after only one fit, the mortality was 16·6 per cent, while in 89 cases having had six to thirty convulsions each, the mortality was 30·3 per cent.

From the results of his investigations, Peterson finds himself in antagonism to the majority of obstetricians who treat the condition by hot packs, active catharsis, sweating, veratrum viride, or anything and everything, while eclamptic toxins are still being elaborated inside the maternal organism, and only when the patient is worse or about to die, decide to empty the uterus.

The fœtal mortality under Cæsarean section is decidedly low ; during the last five years it has now reached the remarkably low figure of 3·4 per cent. This should be compared with the fœtal death-rate for delivery by the vaginal route, which is roughly 20 per cent. When comparing the two figures, it is to be remembered that Cæsarean section is rarely performed for eclamptic cases before the last month of gestation. In conclusion, the author is of opinion that the results of Cæsarean section are such that this measure must be recognized as an efficient means of treatment in eclampsia.

Emphysema of the Neck during Labour.—An interesting case of this rare complication, where the expiratory effort accompanying attempts to expel the fœtus voluntarily during labour led to rupture of air vesicles and emphysema of the connective tissues of the neck, is recorded by Gilbert.[5] The emphysema extended up the neck to the face, even the eyelids and lobes of the ears being crepitant, while below the condition was noted all over the front of the chest, in the

axillæ, and down the back over the shoulders. The labour was terminated with forceps, but delivery was easy. There was a troublesome cough, which ceased after two days. No special treatment was necessary, and the patient readily recovered.

Rupture of the Symphysis Pubis during Labour.—Tuley,[6] in recording a case of this rare condition, gives exhaustive references to the literature and the views of various authors as to the causal factors. In the case recorded, traction had been applied to an unreduced occipito-posterior presentation, and this proving unsuccessful, the case was sent to hospital, where the head was pushed up, turned forward, and delivered with forceps. It was not definitely determined when the accident occurred, as it was only afterwards, when attempting to control hæmorrhage which was localized to lacerations in the region of the urethra, that it was discovered that a space of at least 2½ in. existed between the two pubic bones. The only treatment consisted in strapping the hips, and the patient eventually recovered, and walked well.

There have been 134 cases recorded, and in the vast majority the condition follows upon a forceps operation, especially the high operation in small pelves. In a discussion which ensued, several members recorded their experiences, which went to show that the condition was much commoner than the literature of the subject might suggest, and also that the ill-effects were trivial in the majority of cases.

Drug Treatment.—Hendley[7] finds **Pituitrin** of great value in normal labour. He injects 1 c.c. into the gluteal muscles as soon as the os admits one or two fingers; if the child is not born within the hour, a second injection of 0·5 c.c. is given, and repeated if necessary. If post-partum hæmorrhage supervenes, a further injection will always control it. It shortens the long and exhausting first stage of labour, especially in those cases in which the membranes have ruptured prematurely. In difficult labour, when shock and collapse supervene upon a prolonged chloroform anæsthesia, pituitrin is a powerful remedy. Lindeman,[8] writing on the same subject, is also much impressed with his experience of pituitrin. With the use of the drug, he states that almost invariably the patient will deliver herself, when previously it was the custom to use forceps; it is found that in the group classified as delay in the second stage with no apparent obstruction, and when the head rests on the perineum with ineffectual pains, an injection of pituitrin inaugurates a few strong pains which terminate labour. He further finds that it is especially valuable where for some reason the cervix is undilated or slow in dilating.

Lawrence[9] recounts his favourable experiences with **Scopolamine-Morphine** in normal and abnormal labours. While the application of the drug was still in the experimental stage, the result showed a comparatively high fœtal mortality; thus 12·6 per cent of the children were born drowsy and were resuscitated; four premature children died within three days, and one, also premature, within two hours of birth.

As regards the mothers, the actual birth was remembered in 22 per cent. A series of later cases, however, shows much better results both in regard to the sensibility to pain during the various stages of labour, and in regard to the fœtal mortality.

The use of **Laudanon** in difficult labour is discussed on *p.* 19.

REFERENCES.—[1]*Ind. Med. Gaz.* 1914, 144; [2]*Amer. Jour. Obst.* 1913, ii, 1140; [3]*Ibid.* 1914, i, 909; [4]*Ibid.* 581; [5]*Austral. Med. Gaz.* 1913, 583; [6]*Amer. Jour. Obst.* 1913, ii, 152; [7]*Brit. Med. Jour.* 1914, i, 906; [8]*Amer. Jour. Obst.* 1914, i, 232; [9]*S. Afr. Med. Rec.* 1913, 471.

LACHRYMAL SAC, DISEASES OF THE. *A. Hugh Thompson, M.D.*

The operative treatment of *dacryocystitis* is still being much canvassed, and the method of establishing a direct communication between the tear-sac and nose has its advocates in spite of obvious disadvantages. (Cf. MEDICAL ANNUAL, 1914, 327.) West's operation differs from Toti's in being entirely intranasal, and therefore dispens-

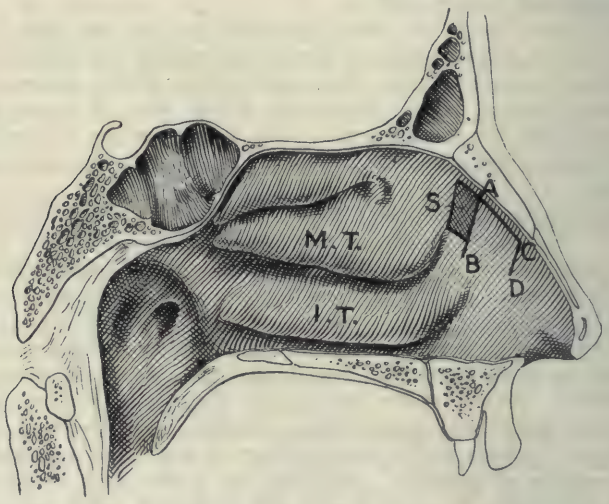


Fig. 59.—Window resection of lachrymal duct. Operation as done by West. A, B, C, D, Mucous flap, which is temporarily turned down. S, Sac exposed by removal of mucous membrane and bone. M.T., Middle turbinate. I.T., Lower turbinate. *(After Paterson.)*

ing with an external scar. The accompanying diagram is made from Paterson's paper on the subject.[1] (*Fig.* 59.) The area marked S indicates the portion of bone to be removed in order to expose the inner wall of the sac, which is then cut away. The duct remains untouched, and the contents of the sac are permitted to drain freely into the nose through the artificial opening. The operation has been performed in Berlin by West in over 200 cases, and in this country it has been taken up to some extent. (See a recent discussion in the Ophthalmological Society.[2]) Without the skill of a practical

rhinologist, however, it is hardly advisable to undertake it. In some cases the anterior end of the middle turbinate may come far forward and overlap the sac, and has to be removed as a preliminary. "Not infrequently a frontal or ethmoidal cell covers the sac and has to be removed." "Bleeding may prove disturbing for a time, when part of the turbinate has to be cut away, and it is not desirable to remove more bone than necessary on that account." As always, satisfactory results are claimed for the operation by its author; but it is more than doubtful whether it will be adopted by the majority of ophthalmic surgeons in preference to the usual operation for complete removal of the lachrymal sac. In cases where it is possible to temporize, syringing through the dilated (or slit) canaliculus may ultimately effect a cure, though it involves a good deal of patience on the part of both surgeon and patient. In cases with a mucopurulent discharge, solutions of **Protargol** of varying strength are useful. **Weak Tincture of Iodine** (*tinct. iodi*, B.P. 1898) has been used with success by Cobb.[3]

Excision of the sac is an operation which is sometimes fairly easy, but on the other hand sometimes not. The greatest difficulty is at times experienced in finding the sac. On this subject the remarks of Elliot are useful.[4] Throughout the operation the important landmark which must never be forgotten is the anterior lip or crest of the lachrymal fossa. The first incision must follow the line of this crescentic ridge, the average length being 20 mm. "The sac is usually found to be covered by a strong fascia, which roofs in the fossa, and which appears to be a backward reflection from the tendo palpebrarum. This fascia is often dense, and when associated with a high nose-bridge and a deep-set orbit, it may lie nearly parallel to the median sagittal plane. On the contrary, a flattened type of face throws this fascial plane more into the plane of the face, thus rendering the wound shallower and the sac more accessible. The former condition obviously has the opposite effect. Both the depth of the wound and the plane of the sac tend to embarrass the operator, who may easily mistake the fascia for bone, slide over it, and burrow out into the orbit. The usual sequel of this by no means uncommon error is that the operator takes a lobule of fat for the sac."

To avoid this it is important, as the second stage of the operation, to divide this fascia along the whole length of the skin incision, taking the aforesaid ridge as the guide. In simple cases the sac is then exposed, and there is no further difficulty; but with a shrivelled contracted sac, and in cases complicated by phlegmonous inflammation, there may be great difficulty still in defining the sac. The rule in these cases should be to remove too much tissue rather than too little.

References.—[1]*Laryngology*, 1914, 169; [2]*Trans. Ophth. Soc.* 1914, xxxiv, 102; [3]*Boston Med. and Surg. Jour.* 1914, ii, 230; [4]*Brit. Med. Jour.* 1913, ii, 1147.

LAPAROTOMY. (*See* Abdomen, Surgery of.)

LARYNX, DISEASES OF. *J. S. Fraser, M.B., F.R.C.S.*

Suspension Laryngoscopy.—Killian[1] explains that he discovered this method by accident. He wanted to get pictures of the larynx made by an artist, and conceived the idea of suspending the head of the cadaver over the end of the post-mortem table by means of a pot-hook, to the lower end of which a spatula was attached. Later he experimented on anæsthetized patients, and later still, with the assistance of cocaine alone, on patients accustomed to the direct method. For a long time inability to see the anterior commissure was an obstacle. This difficulty was obviated by Albrecht, who modified the counter-pressor invented by Brünings. Subsequently local anæsthesia was aided by previous injection of morphia and scopolamine. Recent improvements in the suspension laryngoscopy apparatus include the gutter spatula, which is somewhat V-shaped on cross section and has movable lateral flanges to keep the tongue out of the way. The suspension hook has also been modified by the addition of an adjustable joint. On turning the thumb-screw of this joint in the direction of the hands of a watch, a clearer view of the larynx is rendered possible. As the mouth of the patient must be continuously held open as wide as possible, a gag is absolutely necessary. This is shaped like a bow, and is fitted to the lower part of the spatula hook. The lower part of the bow impinges upon the upper incisor teeth, as the patient's head hangs over the end of the table. The gallows, from

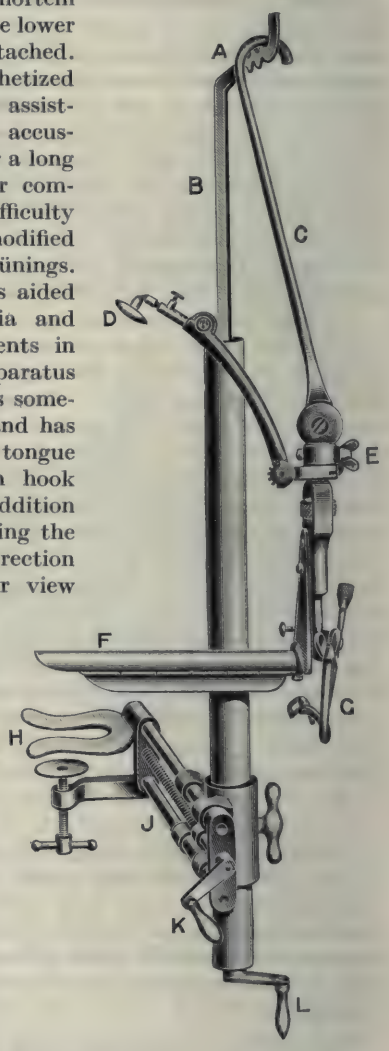


Fig. 60.—Suspension Apparatus Complete.

A, Cross-piece of gallows; B, Gallows can be raised or lowered by handle (L); C, Suspension hook; D, Counter-pressure lever, shown raised and shortened. When in position the anterior plate rests on the cricoid cartilage. E, Thumb-screw for adjusting gallows-hook and spatula; F, Spatula, which is gutter-shaped, with adjustable flanges on each side in order to keep the tongue from bulging; G, Mouth-gag; H, Clamp for fixing gallows to operating-table; J, Rack on which gallows is made to travel to and fro by means of handle (K). In the figure the rack is seen swung back at right angles to its general position when in use, which is parallel with the spatula.

which the suspension hook hangs, is screwed on to the operating-table. It consists essentially of an upright, which can be moved up and down as well as backwards and forwards, and carries a horizontal arm to which the suspension hook is attached. The latest pattern of Killian's operating-table is fitted with a crank handle, by which it can be raised and lowered so as to avoid the necessity of the operator working in a cramped position—a condition which is extremely fatiguing and prejudicial to success. To support the patient's head as it hangs over the end of the table, an adjustable tray has recently been added; for the protection of the operator from expectoration when examining cases of tuberculosis or membranous laryngitis, a sheet of glass may be fixed to the gallows. For purposes of illumination, Killian uses an improved form of the Kirstein head-lamp (Wolff, *Fig.* 61).

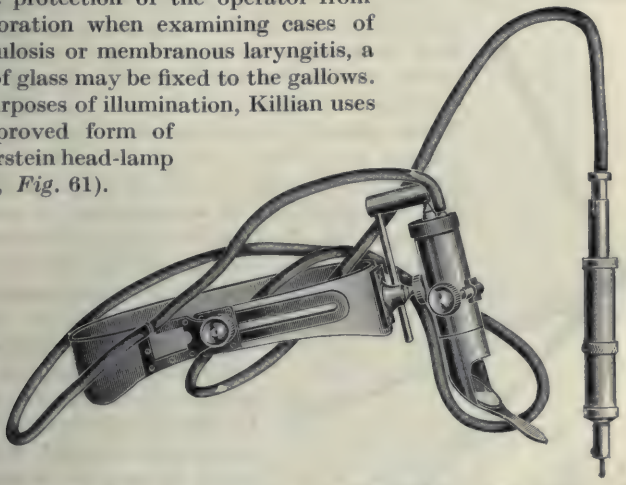


Fig. 61.—Suspension laryngoscopyy. Wolff's head-lamp with rheostat.

Some cases are unsuitable for suspension laryngoscopy, e.g., those who do not open the mouth well, and in whom the upper teeth are very prominent or the tongue very thick and unyielding. For this reason it is advisable to satisfy oneself as to the patient's behaviour under direct examination before proceeding to suspension laryngoscopy. This examination is utilized to determine the length of the spatula to be used in suspension laryngoscopy. The examination by suspension laryngoscopy is best carried out in the morning, with the patient fasting. Killian recommends that the mucous membrane of the base of the tongue, pharynx, and larynx should be painted by means of a laryngeal brush with a 20 per cent solution of cocaine, to which a little adrenalin has been added. Two hours before suspension, the patient is given 1 cgram morphine and 0·3 mgram scopolamine. An hour later the same quantity of both substances is injected. The patient lies supine upon the operating-table, with his head projecting over the end. The forehead light is now switched on, the patient opens his mouth, and the spatula is passed to the posterior pharyngeal wall, and is then moved down to catch the epiglottis safely. The

introduction of the spatula is facilitated by pulling out the tongue and holding it. It is important to keep exactly in the middle line of the tongue. When the epiglottis comes into view, the end of the spatula is passed over it to lift it up. The mouth-gag is now placed in position, with its ledge over the teeth of the upper jaw, and the suspension hook is fixed on to the horizontal bar of the gallows. The vertical bar of the gallows is now moved upwards or forwards by means of the crank handles, so as to obtain the best possible view of the interior of the larynx: the thumb-screw of the spatula also assists in this adjustment. If the operation is being performed under general anæsthesia, it is necessary to have an apparatus such as Junker's or Braun's, so that the anæsthetist may not interfere with the operator. The anterior commissure usually comes in sight when digital pressure is made upon the cricoid in the middle line of the neck, or by the counter-pressure apparatus. When the larynx is in view, the operating table is so adjusted, by means of its crank handle, that one can see comfortably. Seiffert, of Breslau, has submitted himself to suspension laryngoscopy, and experienced only an uncomfortable pressure against the teeth, and some tension in the region of the faucial pillars. If all preparations have been successfully carried out, the whole topography of the pharynx and larynx can be taken in at a glance. (*Plate XXVII.*)

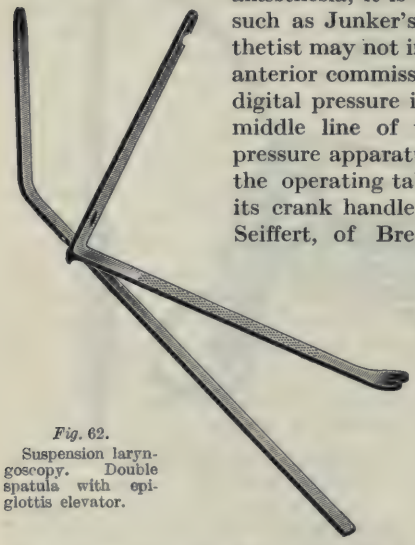
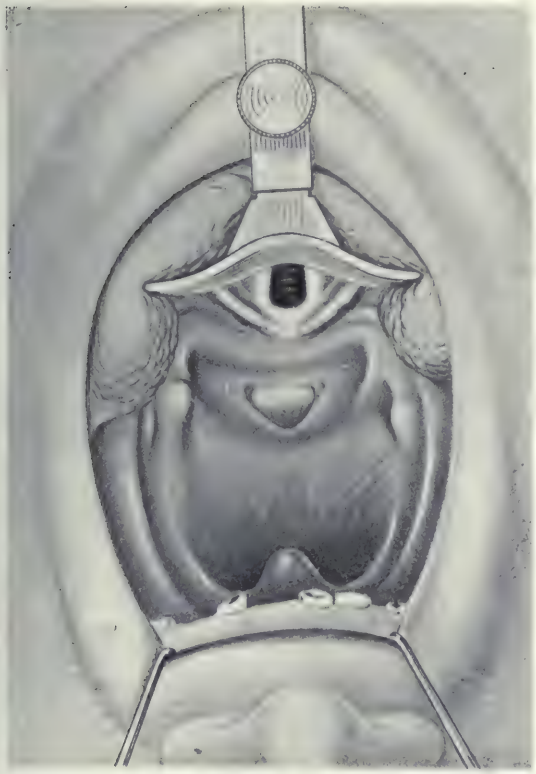


Fig. 62.
Suspension laryngoscopy. Double spatula with epiglottis elevator.

The practical applications of the method are as follow: (1) The new method lends itself excellently to the demonstration of the interior of the larynx to a large circle of students; minor operations can also be shown, but Killian considers it essential for any one who desires to use the method with success to be familiar with the anatomy, physiology, and pathology of the region involved. (2) Suspension laryngoscopy is of great use in children, the only contra-indication being marked dyspnœa (tracheotomy instruments should of course be at hand). When the larynx has once been brought into view, tracheotomy is no longer necessary, as an intubation tube can be passed through the glottis at once. Artificial respiration can be performed with the suspension hook in position. Suspension laryngoscopy in children may be employed in dealing with such conditions as subglottic swelling, or false-membrane formation, nodules on the cords, papilloma, tubercle, foreign body, or in cases of difficult decannulement. It can be further used in preparation for bronchoscopy or œsophagoscopy. In dealing with papillomata in children, Killian

PLATE XXVII.

SUSPENSION LARYNGOSCOPY



View with suspension laryngoscopy in the cadaver. Obtained with the old Kirstein's spatula. The epiglottis is hidden by the spatula. Below the spatula the vocal cords and and ary-epiglottic folds are seen. Below these again the hypopharynx is seen as opened up by the suspension method.

PLATE XXVIII.

SUSPENSION LARYNGOSCOPY—*continued*

Operating table, head aspect. Table raised, gallows clamped on.

PLATE XXIX.

SUSPENSION LARYNGOSCOPY—*continued*

Introduction of the suspension hook. Note the head-rest.

PLATE XXX.

SUSPENSION LARYNGOSCOPY—*continued*

The suspension apparatus in position. The operator sits and inspects the larynx, etc. The anæsthetic is being given through Junker's apparatus.

PLATE XXXI.

SUSPENSION LARYNGOSCOPY—*continued*

Three-channelled tube attached to Braun's anæsthetic apparatus and to water air-pump.

PLATE XXXII.

SUSPENSION LARYNGOSCOPY—*continued*

Application of mesothorium.

advises that, after the growths have been removed by the double curette, the larynx should be brushed with 1 per cent **Salicylic Acid** in spirit. To prevent recurrence, he gives iodide of potash and arsenic, but believes that recurrence is best prevented by the use of **Radium** or **Mesothorium.** (3) In small children who cry a great deal, nodules not infrequently develop on the vocal cords and lead to persistent hoarseness. They are usually associated with slight chronic catarrh. These nodules may be easily removed by suspension laryngoscopy. (4) Tonsillectomy may be performed with the aid of the suspension laryngoscopy apparatus—the tonsil of course being seen upside down. The blood runs into the naso-pharynx and causes less disturbance. (5) Foreign bodies may easily be removed by suspension laryngoscopy. (6) Bronchoscopy is greatly aided by the use of this method. (7) Tuberculosis of the larynx. Killian notes that it is only since we have learnt to improve the condition of the lung by residence in a sanatorium, that better results have been obtained in the treatment of laryngeal tuberculosis. Since the introduction of direct laryngoscopy, operative treatment of the larynx has made marked progress. Curettage and deep puncture by the galvano-cautery can be carried out with the greatest precision by the use of the suspension apparatus, as the operator can now work with both hands, using the curette and the mop at the same time. Killian has never met with any serious bleeding in these cases, and remarks upon the clean appearance of laryngeal wounds some days after curettage under suspension laryngoscopy. The after-treatment consists in the administration of **Sodium Iodide** internally, and the local application of **Hydrogen Peroxide** as suggested by Pfannenstiel. Only after this should lactic acid be used. Brieger and Seiffert have already tried direct application of x rays in these cases, with promising results. (8) Simple growths in the larynx may be removed with greater precision by the new method than by the indirect one. (9) Cancer of the larynx. A piece of the growth may be removed for microscopic examination, and E. Meyer even reports the excision of a carcinoma of the epiglottis. Such cases, however, must be selected with great care. Radium or mesothorium may be attached to a slender rod, and left in position in the larynx, for as long as an hour and a half—at any rate in tolerant patients. (*See Plate XXXII.*) Killian admits, however, that this line of treatment has not been very successful.

Albrecht[2] has found that suspension laryngoscopy is very easy in children, on account of the upright position of the epiglottis and the slender build of the neck. Large papillomata of the larynx are removed with a fine double spoon-forceps, and the projections which remain are smoothed off with a double curette, particular attention being paid to the ventricles of Morgagni and the subglottic region. Finally Albrecht passes a simple curette over the whole mucous surface of the larynx, and notes that only diseased tissue comes away. He has treated nine cases in this way : of these, two keep on showing recur-

rences and have to wear tracheotomy tubes. Of the seven remaining children, one has remained free from recurrence for ten months, two for seven months, three for six months, and one for four months.

Direct Laryngoscopy.—Harmon-Smith[3] records the case of a girl, age 2½ years, who suffered from hoarseness and croupy cough. The case was diagnosed as bronchial croup, and an intubation tube was inserted and diphtheria antitoxin injected, although a culture from the pharynx proved negative. Later on, by the indirect method, the case was diagnosed as one of papilloma, and it was only when the direct method was used that a bright object was seen protruding from between the vocal cords. This was easily removed with straight forceps, and proved to be a safety pin. The child remained hoarse for several weeks, but ultimately made a good recovery. Harmon-Smith remarks that an *x*-ray examination would have shown the real nature of this case.

Disturbances of the Singing Voice.—Dundas Grant[4] analyzes 131 cases in which singers have applied to him for treatment of their vocal organs. These he divides into two groups: (1) Defective vocal utterance; and (2) Abnormal sensations associated with singing.

Under "defective vocal utterance," Grant includes defective tone (hoarseness, roughness, exaggerated break, etc.); defective vocal power (weakness and unreliability); impaired resonance (nasal tone and faulty intonation). Thirty-nine patients complained of hoarseness, and of these twenty-one had obvious changes in the larynx—interarytenoid swelling, tumefaction of the cords with defective adduction, congestion and maceration of the cords, nodulation, sub-glottic thickening, etc. In sixteen cases there was no definite laryngeal change, but the patients presented such conditions as granular pharyngitis, deflections of the nasal septum, hypertrophic rhinitis, adenoids, elongated uvula, general debility, etc. Thirteen patients complained of weakness of the voice, and in them Grant found such conditions as general debility, congestion or nodulation of the vocal cords, or imperfect approximation of the cords. Twenty patients complained of want of resonance or similar symptoms. These patients were found to be suffering from nasal obstruction, from various causes such as hypertrophic rhinitis, adenoids, septal deflections. Grant believes that if a patient tends to sing flat when he is suffering from catarrhal affections or from general debility, the prognosis is hopeful, but that if he sings sharp, the outlook is much less favourable, though he has known great improvement in this latter group if the patient learns to play a string instrument.

The patients complaining of 'abnormal sensations' during singing numbered forty-three. The following sensations were noted: aching, tired feeling, soreness, swelling, cough, tightness, dryness, tickling. In these, examination revealed such conditions as enlarged tonsils, lateral pharyngitis, chronic rhinitis, relaxation of the vocal cords, congestion of the cords with adherent mucus, enlarged lingual tonsil, adenoids, etc. Grant advises us to remember that a singer is not

merely a vocal organ, but a complex human organism, requiring a healthy and vigorous vocal organ, a normal and vigorous body, and a highly sensitive nervous system.

Grant thinks that professors of singing are tempted to try to make the very utmost of a fine voice and to get very near the breaking strain, if not beyond it. Grant is opposed to the teaching of the anatomy, and even of the physiology of the voice, to the student of singing, though he thinks that teachers should have a practical knowledge of the structure and functions of the organ. To get a general idea of the patient's voice, Grant takes the middle C^1 tuning-fork, and lets him sing very softly the sound 'la la la' up to G^2. He can by this means generally arrive at a judgement as to the patient's tone, the position of the break, whether he pushes the chest voice too high, whether he opens his mouth, how he breathes, and even as to his general intelligence. The strength of the heart is tested considerably by singing, and the heart muscle sometimes yields under the strain. The detection of incipient tuberculosis is of great importance. Grant notes that great care must be exercised in dealing with singers, as the least suggestion of the need for care is apt to put them in a state of panic.

It is unnecessary to mention details of the surgical treatment of adenoids, enlarged tonsils, and nasal abnormalities. Grant holds that hypertrophy of the lingual tonsil may sometimes hamper the movements of the epiglottis. He removes it with Murphy's guillotine. With regard to breathing, Grant agrees with Aikin that the singer should get as much breath as possible by all the means in his power—that is, by a free use of the ribs and diaphragm, as prompted by instinct. In dealing with vocal nodules, which are due to excessive pressure at the nodal point, Grant follows Holbrook Curtis in getting the patient to sing the syllable 'pmaw' on a high head note. If a patient complains of difficulty in singing before an audience, Grant finds **Bromide** of use in some cases, and **Nux Vomica** in others: a spray of **Mentholized Oil** may be given. Paresis of the internal tensors of the cords is usually associated with general constitutional feebleness, and is best treated by rest, nux vomica with strophan thus, and the interrupted current to the sides of the larynx. If hoarseness be associated with inflammation of the cords, voice rest is of the greatest importance, whereas if it is associated with paresis of these structures, exercise must be advised. Diet and regimen are important factors, but must not be over-insisted on. If the patient thinks too much about the health of his body, he is apt to induce an unhealthy state of mind.

Laryngitis in Smokers.—Colombel[5] holds that this is greatly increased by any other source of irritation, such as dust, alcohol, syphilis, tubercle, etc. The characteristic symptom of the condition is alteration of the voice, and examination shows chronic laryngitis of the 'pachydermia' variety. The cords are reddened and occasionally present small ulcerations. Treatment consists in the removal of the cause. Later, if necessary, hypertrophic areas may be cauterized.

Laryngeal Tuberculosis.—Sir StClair Thomson[6] gives his experience of three years' treatment of laryngeal tuberculosis in the King Edward Sanatorium at Midhurst. The cases there are examined regularly once each month, as regards their laryngeal condition. In all, 795 patients have been investigated. Even in the selected cases sent to the sanatorium, laryngeal tuberculosis is found in 25·6 per cent. Laryngeal tuberculosis is as common in females as in males, and is much more frequent (13·7 per cent) in the early favourable cases of group 1 (Turban-Gerhardt classification) than is generally recognized. In group 2 of the above classification, the percentage is doubled (27·1), and in the advanced cases of group 3 it is trebled (40·8). The expectation of life is markedly decreased by the presence of laryngeal tuberculosis. It may often be present, although the patient makes no complaint of the throat, and although the voice be unaltered. For this reason, the larynx should be carefully inspected in every case. Arrest of laryngeal tuberculosis can be effected in a sanatorium in 20·7 per cent of all cases. Limited and slight laryngeal lesions may become arrested spontaneously by **Sanatorium Treatment.** The **Galvano-cautery** is the best weapon we have at present for local treatment: it effected a cure in 41·6 per cent of the cases in which it was used. Local measures are much more promising under sanatorium conditions.

Davis[7] points out that lesions limited to the vocal cords are practically painless. Acute cases, which run a rapid retrogressive course, suffer most, especially if sepsis be superadded. Superficial ulcerations of the fauces, tonsils, and pharynx are extremely painful, as are also ulcerations of the base of the tongue and of the arytenoids. The commonest site of pain is immediately over the larynx, but faucial ulceration produces pain in the ears. It is important to treat cough by the continuous inhalation of **Creosote, Eucalyptus, Menthol,** and **Chloroform,** with a Burney Yeo respirator, or by the administration of **Diamorphine Hydrochloride** (heroin), **Codeia,** or **Morphia** linctus. The **Ipecac.** and **Morphia Lozenge** is most useful. For the dysphagia, which is frequently so intense as to lead to rapid emaciation, Hoffmann has recommended the **Injection of the Internal Laryngeal Nerves with Alcohol.** These nerves supply the ventricular bands, the anterior surface of the arytenoids, the ary-epiglottic folds, and the laryngeal surface of the epiglottis. *It should be clearly understood that if the lesion is at the base of the tongue, on the fauces or pharynx, no relief is obtained from this treatment.* For the injection, the most accurate surface marking is midway between the hyoid bone and the upper border of the thyroid cartilage, immediately above the superior thyroid tubercle, which, in most subjects, is easily palpated. Davis injects a solution containing 2 gr. of eucaine in one ounce of 80 per cent alcohol, according to the method described by Dundas Grant. The patient lies prone, with the head and neck slightly extended and the chin turned away from the point of injection. The skin is painted with iodine. The larynx is pressed out of the

PLATE XXXIII.

CANCER OF VOCAL CORD

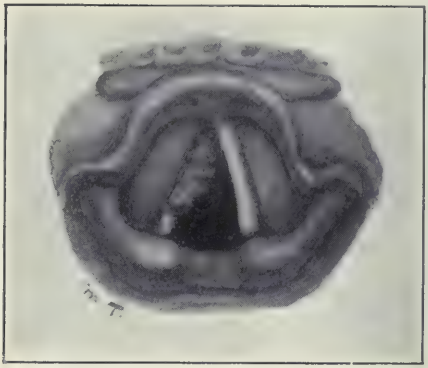


Fig. A.—Malignant growth of right vocal cord.

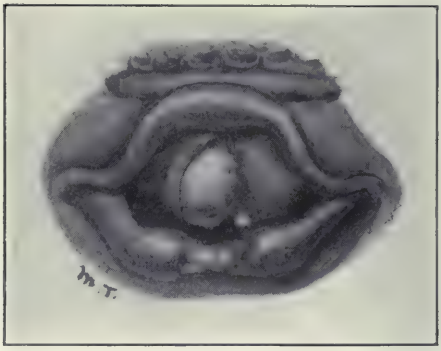


Fig. B.—Granuloma following removal of malignant growth of right vocal cord.

StClair Thomson

middle line by the thumb and made to project on the side about to be injected. The nerve is marked out by the nail of the index finger, which is placed between the hyoid bone and the thyroid cartilage, immediately above the superior thyroid tubercle, where a tender spot is found. The needle is now pushed in with a jerk at right angles to the surface, to a depth of 1½ cm. The needle is carefully moved so as to seek the spot at which the patient complains of pain in the ear. From 1 to 2 c.c. of the slightly warmed alcoholic solution (absolute alcohol 85 per cent) is injected until the pain in the ear has ceased. Relief is variable, but may last as long as forty days. There is no objection to two or even more injections.

Ulceration of the free upper portion of the epiglottis is treated by amputation with punch forceps. **Galvano-caustic Puncture** and **Curetting** frequently ease pain, while ulceration of the fauces and base of the tongue is improved by painting with **Tinct. Iodi Mit.** (*tinct. iodi*, B.P. 1898) and insufflating **Orthoform** and **Anæthesin** powder. Cases of tuberculous laryngitis, with dysphagia, should avoid acid drinks, spiced food, and condiments. Soft minced food, of porridge consistence, is more easily taken. Davis finds that pressure on the ears is useless to relieve dysphagia, but some amelioration may be obtained from firmly gripping the larynx so as to avoid movement as far as possible during swallowing.

Cancer (*Plate XXXIII*).—StClair Thomson[8] holds that treatment of intrinsic cancer of the larynx by **Laryngo-fissure** is remarkably satisfactory. It is doubtful if the results for operation for cancer in any other part of the body can surpass those the writer has previously published, i.e., no patient has been lost by operation, and 80 per cent have remained free from recurrence—in some cases for as long as ten years. Similar favourable figures have been recorded by Semon and Butlin. Hitherto StClair Thomson has been a little sceptical in accepting the records which claim permanent cures by operating through the mouth, but he now quotes a case in which this claim appears to have been substantiated. StClair Thomson confirms Semon's opinion that, if recurrence does not take place during the first year after operation, there is every prospect of permanent cure. While maintaining that laryngo-fissure is the correct operation in cases of intrinsic cancer of the larynx, Thomson holds that it will be a loss to laryngoscopy, and to our patients, if the rising generation of throat surgeons neglect to acquire the gentler art of indirect laryngoscopy, and limit themselves to the easier but rougher technique of direct examination.

Schmiegelow[9] admits that the whole of our present knowledge of the diagnosis and treatment of intrinsic laryngeal cancer is founded on the work of Semon and Butlin. Before their time the disease had always been diagnosed too late. In the great majority of cases intralaryngeal cancer appears as a primary cancer of the vocal cord, generally in the central part. The patient soon complains of hoarseness, which should lead to an examination of the larynx and the early

recognition of the disease. Out of 66 cases of laryngeal cancer, the vocal cord was primarily affected in 36. If cases do not present themselves till the growth has extended to the anterior commissure, the prognosis becomes more serious, as the tumour must be cut before entering the larynx. Cancers of the larynx which do not primarily attack the vocal cords have a bad prognosis, because they are discovered late, are generally of a medullary character, grow quickly, and show a greater tendency to lymphatic involvement. The diagnosis is made by the laryngoscope, supported by microscopic examination of a removed piece of the growth.

Operation is performed under general anæsthesia, after an injection of morphia. A low tracheotomy is done, Hahn's tampon-cannula introduced, the thyroid cartilage divided, and the pharynx packed from below with sterilized gauze. The laryngeal mucous membrane is now painted with 10 per cent cocaine and adrenalin, and the growth removed with knife and scissors. The bleeding is stopped and the thyrotomy wound at once closed. Schmiegelow has collected the results obtained by Semon, Chiari, StClair Thomson, and himself; the cases total 96, of whom 44 remained cured for over three years and 17 for one to three years. Recurrence took place in 25 cases, and there were 9 deaths from operation. The functional result is usually exceedingly good, the voice being strong and generally sonorous.

Paralysis of the Recurrent Laryngeal Nerves.—De Havilland Hall[10] has analyzed 51 cases. In 35 the left vocal cord was affected, and in 16 cases the right. The most common cause of left recurrent paralysis is aneurysm of the arch of the aorta, and indeed paralysis of the left cord is often the only objective indication of aortic aneurysm. In a case of this kind, Hall detected the cadaveric position of the left cord nearly a year before there were any other signs of the aneurysm (this was before the days of *x*-ray examination). Paralysis of the left cord indicates that the position of the aneurysm is the transverse or descending part of the aortic arch. If we exclude malignant disease of the œsophagus, it may be said that the right recurrent nerve is hardly ever paralyzed as the result of pressure within the thorax. After aneurysm, the most common cause of paralysis is some intrathoracic growth. In malignant disease of the œsophagus, Hall's statistics show that the two sides are almost equally affected, and the same holds good when the paralysis is due to central causes or toxins. In children, recurrent paralysis suggests diphtheria, tuberculous glands, cervical caries, and meningitis; in young adults, pulmonary tuberculosis, apical pleurisy, and mitral disease, with enlarged left auricle; in middle-aged men, aneurysm is by far the most common cause. After the age of sixty, the probability of malignant disease in the mediastinum should be borne in mind.

Ferrier, in the course of a discussion, stated that he had demonstrated, many years ago, that in peripheral paralysis, from whatever cause, the extensor muscles were the first to suffer, e.g., in neuritis due to alcohol, lead, arsenic, beri-beri, etc., the extensor muscles of the

limbs are first, and often alone, affected. In lead-poisoning we have the familiar drop-wrist, while the supinator longus (supplied by the same nerve) escapes. In alcoholic neuritis we have at first drop-foot from paralysis of the muscles supplied by the external popliteal nerve. These facts point to a greater vulnerability of the extensor nerves to destructive influences. These nerves lose their excitability after death sooner than the flexors and adductors. In the vast majority of cases of recurrent laryngeal paralysis due to tabes, neuritic or degenerative changes have been found in the vagus trunk, recurrent laryngeal nerve, or in the intramuscular nerve-endings, particularly in the posterior crico-arytenoid muscles. Though degenerative changes have also been described in the medulla, in no case has primary degeneration ever been limited to the nucleus ambiguus, the recognized motor nucleus of the laryngeal muscles. The condition here has been one of so-called ' réaction à distance,' or retrograde degeneration. Ferrier stated that in bulbar paralysis, in which the lips, tongue, pharynx, and larynx are progressively affected, the weakness of the adductors of the vocal cords is the first sign in the larynx.

Permewan pointed out that in the first stage of unilateral organic paralysis there is no affection of the voice, as the abductors are alone affected, and almost no affection of breathing, because the other cord is able to make up the deficiency. Thus unilateral abductor paralysis is often missed or only discovered by accident. Permewan thinks it probable that in ' toxic affections ' will be found the explanation of a considerable number of cases whose cause has not been definitely ascertained. Semon opposed the views put forward by Ferrier, and could not admit that the conditions as observed in the larynx were a mere local illustration of Ferrier's general law. Semon does not believe in the peripheral origin of tabetic laryngeal paralysis. Thirty-two years have elapsed since the promulgation of his (Semon's) law, and in the whole of that time only one exception had been actually established in a case of recurrent paralysis of peripheral origin (Saundby's case). Not a single exception had been proved in a case of central origin. Semon heartily agreed with the demand for a revision of ' Semon's law ' if this was necessary. Jobson Horne had examined 359 consecutive cases of pulmonary tuberculosis, and had met with unilateral paralysis of the recurrent nerve in 7. In 5 the right cord was paralyzed, and in 4 out of the 5 signs of pulmonary disease were found at the right apex.

References.—[1]*Jour. Laryngol.* 1914, 337 ; [2]*Ibid.* 71 ; [3]*N.Y. Med. Jour.* 1913, ii, 313 ; [4]*Clin. Jour.* 1913, Nov. 481 ; [5]*Arch. de Laryngol. etc.* 1910, Nov. ; [6]*Brit. Med. Jour.* 1914, i, 801 ; [7]*Lancet*, 1913, ii, 1111 ; [8]*Ibid.* 1914, i, 1593 ; [9]*Ibid.* ii, 300 ; [10]*Jour. Laryngol.* 1913, 648.

LEISHMANIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

Kala-Azar.—McCombie Young[1] reports an elaborate investigation of the present occurrence of kala-azar in a large part of Assam, which was more than decimated by the epidemic beginning at the foot of the Gara Hills about 1875. With the aid of a number of assistants,

many villages in all the affected districts were visited, and spleen punctures made in suspicious cases. Out of 729 cases seen, two-thirds were in males, and 77·3 per cent not over twenty years of age, against 50 per cent in Rogers's cases in 1896–7. In 52 per cent, a previous history of kala-azar in the family was obtained. The epidemic died down after reaching its height in 1897; but during the last two years there has been a slight increase, especially in the Nowgong district, though without evidence of a general increased mortality. The areas now found to be affected are almost exactly the same as reported by Rogers in 1897, the eastern part of the Brahmaputra valley still remaining free, except a small area of Gholaghat. "It is pretty generally acknowledged that the Upper Assam valley was saved from infection because immigrants were refused admission to Gholaghat during the epidemic." He advises applying the Infectious Diseases Act as a preventive measure in infected villages, as originally proposed by Rogers. Some cases, which had been verified by spleen puncture, have recovered.

In a further paper[2] the same worker refers to the success of Dodds Price and Rogers (see below) in eradicating kala-azar from tea gardens by segregation measures, and records his experience with somewhat similar measures in villages in the dangerous focus in Gholaghat, which threatens the hitherto uninfected eastern districts. A house-to-house survey of the whole subdivision having been made, segregation measures were put in force, the infected families being removed to new houses built by Government at a minimum distance of fifty yards from the old site. The evacuated houses, with bedding and clothing, were burnt, compensation being given. At the end of three years, out of forty infected families removed to new sites, only one case of infection, not obviously contracted upon the old site, has occurred. As it was not possible to separate the sick completely; the measure has been attended with unexpectedly great success, and leads to the hope that the focus may be stamped out by perseverance. These results also point to a site infection.

J. Dodds Price and L. Rogers,[3] in a paper on the uniform success of segregation measures in eradicating kala-azar from Assam tea gardens, record the work of Dodds Price in carrying out the recommendations of Rogers's original report of 1897. In eighteen years, ten badly infected coolie lines had been moved, and the disease stamped out of a population of 7000 souls. Two control lines, in which these measures had not been carried out, still remained infected after eighteen and twenty years respectively, showing that the disease does not die out as long as new coolies are placed in infected lines. The distance of the new lines from the old infected ones varied from 300 yards to three-fourths of a mile. The water-supply and food could be excluded as factors in spreading the disease, as could the mosquito. The indications were in favour of a non-flying insect as the carrier, the most probable being the bed-bug, although the infection of the site itself cannot yet be excluded. Evidence is also given

regarding the permanence of the recovery of a certain proportion of the cases, many being coolies who are still doing full work several years after regaining their health.

C. M. Wenyon[4] deals with kala-azar in Malta, where it was first found in the infantile form in 1910 in both children and dogs by Critien, whose observations Wenyon confirms. As malaria does not exist on the island the problem is simplified. As dogs have been infected in India by Donovan and Patton, although not found to be naturally infected, it can no longer be maintained that the African and Mediterranean form of kala-azar is distinct from that of India. He has been unable to confirm Basile's claim to have transmitted kala-azar from dog to dog by means of fleas, which may harbour a flagellate difficult to distinguish from leishmania. In two series of fleas taken off dogs, infected and not infected with kala-azar respectively, it happened that the non-infected dog series showed the larger number of flagellates in the hind gut. The natural flagellates of the dog-flea will withstand even twenty-four hours' drying, but those of kala-azar are rapidly killed by desiccation. In some cases, when kala-azar parasites could not be found microscopically, they may be discovered by cultivating them on Novy-McNeal media. The writer records a case of ulceration of the ear in a patient from South America, in which the diagnosis was made of dermal leishmaniasis by culture, and he thinks these cases to be similar to Oriental sore. Martin Meyer and H. Werner[5] record the cultivation of the kala-azar parasite from the peripheral blood, and Wenyon[6] has had a similar success.

C. Nicolle[7] deals with Mediterranean kala-azar, describing the well-known symptoms of the disease. Spleen puncture is essential to the certain diagnosis, and he found it to be harmless. Negative cultures made from the spleen blood are necessary to prove a cure. No results have yet been obtained in the treatment of the disease by quinine or arsenic preparations.

Oriental Sore.—R. Row[8] records the successful production of generalized leishmaniasis in a mouse by inoculation with a culture of *Leishmania tropica* from an Oriental sore, and, contrary to other writers, suggests that the parasite of this disease is identical with that of kala-azar. M. E. P. Minett[9] records a case of dermal leishmaniasis in British Guinea in the person of a negro with multiple papular lesions on the arms, legs, and face. The case was thought to be yaws until the Leishman parasites were found when searching for spirochætes. E. L. McEwen[10] records a case of Oriental sore in a patient at Chicago, who had brought the disease from South America. The lesions appeared on the ear, where he had been bitten while in Brazil. The literature of previous cases in South America, where it is now known to be a common disease, is reviewed.

References.—[1]*Ind. Jour. Med. Research*, 1913, 338, and *Jour. Trop. Med.* 1913, 338; [2]*Ind. Med. Gaz.* 1914, 301; [3]*Brit. Med. Jour.* 1914, i, 285; [4]*Jour. Trop. Med.* 1914, 68; [5]*Deut. med. Woch.* 1914, 67; [6]*Jour. Trop. Med.* 1914, 49; [7]*Presse Méd.* 1914, 213; [8]*Bull. Soc. Path. Exotique*, 1914, 272; [9]*Jour. Trop. Med.* 1913, 349; [10]*Jour. Cutan. Dis.* 1914, 275.

LEPROSY. *Sir Leonard Rogers, M.D., F.R.C.P.*

The battle regarding the cultivability of the leprosy bacillus continues. In an important paper, Henry Fraser and W. Fletcher[1] record work in the Kuala Lumpur laboratory during eighteen months among 250 patients in the leper asylum only half a mile from the laboratory. Pieces of the nodules were excised, and proved with the microscope to be swarming with leprosy bacilli. In addition to agar and blood-serum media, the special methods by which Clegg, Rost, Williams, Duval, and Bayon respectively have claimed success, were all tried repeatedly, with entirely negative results. The widely prevalent diphtheroid bacilli were occasionally obtained, and among these a few of the originally inoculated acid-fast leprosy bacilli might still be found surviving, but there was no evidence of their having multiplied. Material obtained from 32 cases of non-ulcerating nodular leprosy was used in making 373 inoculations on the various media.

David Thomson[2] presents a preliminary note on leprosy and bed-bugs, in 105 of which, fed on lepers, no acid-fast bacilli were ever found, while 107 control bugs caught in Liverpool were also negative. A. J. Smith, K. M. Lynch, and Da Rivas[3] consider the same question. They used one of Duval's original strains, which showed both acid-fast and non-acid-fast bacilli, and which they admit have not yet been definitely proved to be true leprosy bacilli. The organism readily infected fish, which they think supports Jonathan Hutchinson's theory. They experimented with the common bed-bug (*Cimex lectularius*), which readily sucked up citrated blood containing the bacilli in a vessel covered with a piece of fresh rat's skin and kept warm in an incubator. From observations on over one hundred infected bugs, the authors convinced themselves that the bacilli increased in size and numbers within the insects, not only in the alimentary canal, but throughout the body. They were also able to feed bugs on two leprosy patients, and found acid-fast bacilli of the lepra type in some of them. They failed to find any animal susceptible to the organism which bed-bugs would bite, but demonstrated acid-fast bacilli in the skin of guinea-pigs bitten by the infected bugs, so that it would appear to be possible for the disease to be conveyed from man to man by bed-bugs among other biting insects.

J. A. Honeij[4] has noted that in leprosy the morning pulse is higher than the evening one, often markedly so, and regards this as of diagnostic importance, while it is also of use in the prognosis, as it is most frequently observed and most persistent in the worst cases.

W. C. Rucker[5] considers the prevalence of leprosy in the United States, and concludes that the disease is increasing and becoming a serious danger, which can only be adequately met by the establishment of a national leprosarium. Bayon[6] writes further on this subject. He thinks the disease is slowly contagious by contact and not through insects.

TREATMENT. — Bayon advises **Chaulmoogra Oil,** or better, its refined constituent **Antileprol,** in 3- to 5-c.c. doses intramuscularly, or

from 15 to 150 min. daily by the mouth. In two cases in the early macular stage a **Vaccine** made from cultures of the leprosy bacillus isolated by Kedniwsky has given very satisfactory results. The only effective preventive measure is **Segregation,** by the energetic use of which the Americans have reduced the new admissions in the Philippines by 90 per cent.

B. J. Courtney[7] reports on the use of intravenous injection of **Iodoform** in leprosy on similar lines to Crofton's in tuberculosis. A powdered ½-gr. tabloid of iodoform is mixed with 3 min. of liquid paraffin and 7 min. of ether in a glass syringe, and the needle sealed with lanolin until the iodoform is dissolved, and the whole injected intravenously. The solution can be kept ready prepared with a slight excess of ether in a non-actinic bottle. Twelve patients have been treated for three months or longer, five of whom were purely anæsthetic in type. Half a grain twice a week was used first, and increased to 1 gr. five times a week. Doses of 10 to 130 min. were also injected into nodules, and produced ulceration. In three of the four tuberculous cases, and two of the three mixed type, there was improvement. After from six to twelve weeks, nodules broke down and ulcerated, with fever, discharging many bacilli and then healing. The thickening of the face and ears was much reduced. No good resulted in the anæsthetic cases.

T. S. Davies[8] gives further information on the case reported in June, 1913, as treated by Bayon's **Vaccine.** The treatment has been continued since that time and further progress obtained, although it is slower than formerly. P. Unna, jun.,[9] describes the treatment of leprosy by **Diathermy,** using a high-frequency current, and found it of value, especially in the nerve form of the disease.

Salvarsan-Copper used with encouraging results in one case (*p.* 32).

REFERENCES.—[1]*Lancet,* 1913, ii, 918 ; [2]*Brit. Med. Jour.* 1913, ii, 849 ; [3]*Amer. Jour. Med. Sci.* 1913, ii, 671 ; [4]*Boston Med. and Surg. Jour.* 1914, i, 233 ; [5]*Jour. Amer. Med. Assoc.* 1914, i, 297 ; [6]*Brit. Med. Jour.* 1913, ii, 1420 ; [7]*Lancet,* 1914, i, 1806 ; [8]*S. Afric. Med. Jour.* 1914, 77 ; [9]*Berl. klin. Woch.* 1913, 2138.

LEUKÆMIA.

(*Vol.* 1914, *p.* 334)—Certain of the symptoms are relieved by the administration of **Benzol,** 2 to 5 gr. daily, but caution is necessary in pushing the drug. The subject is fully discussed at the above reference.

LICHEN PLANUS. *E. Graham Little, M.D., F.R.C.P.*

Sutton[1] contributes a careful histological examination of two cases of ringed lichen planus: the first of a type not infrequently met with, the second clinically resembling granuloma annulare, but proving on histological examination to be lichen planus. This latter case is of great interest, in view of the theory which regarded granuloma annulare as a form of lichen planus, with which it has probably no connection. He also describes a curious case of linear lichen planus, and discusses the various explanations of this distribution, rejecting that which ascribes it to the distribution of peripheral nerves, Voight's

lines, or Head's metameric areas, and supporting the view that it is due to an infection, which in the case of linear distributions might be caused by scratching. Bullous lichen planus is a rare curiosity, and Sutton adds two new cases of his own to the scanty list in which that phenomenon is recorded. In the second of these a histological examination was made, and a detailed description of this is given. A case of lichen planus atrophicus is also included in this rich collection of out-of-the-way manifestations of a protean affection. Histological investigation of this approximated it to the form described by Hallopeau as lichen planus sclerosus. Hypertrophic varieties are less unusual, and this author claims to have seen a dozen cases in three years, some of which are here described histologically. A study of three cases of the so-called lichen simplex chronicus of Vidal, leads the author to regard this disease as not connected with lichen planus, but as "a circumscribed pruritus with subsequent lichenification." Sutton has also an instance of the eruption named by Brocq lichen obtusus corneus, which Hyde renamed prurigo nodularis, and the view of its connections with prurigo rather than with lichen planus receives support from Sutton, whose histological examination of his case, given in detail, gives no countenance to the classification with lichen. Kaposi's lichen ruber moniliformis, of which Sutton reports another example, is also probably a special type of 'prurigo nodularis,' and not related to lichen planus.

Mercury is greatly preferred to arsenic by this author, and is best given in the form of intramuscular injections of the biniodide or bichloride, dissolved in water or oil, and in doses of $\frac{1}{12}$ to $\frac{1}{6}$ gr. daily. Salvarsan and neosalvarsan were tried without benefit. Alkaline diuretics, with or without small amounts of bromide, lessen irritability. In hypertrophic cases the mercurial medication may be alternated with arsenic, or better with arsenic and iron. Local antipruritics are valuable adjuvants, and the following formulæ are recommended :—

℞	Phenol	℥ v-x	Zinc ointment	ʒij
	Menthol	gr. v-x	Anhydrous wool fat	ʒiv
	Ammoniated mercurial ointment	ʒij	Lime water, sufficient to saturate	

Make into an ointment. Apply freely two or three times daily.

In addition to an ointment, it is advisable to prescribe a soothing, non-greasy application which the patient may apply at will. One of the best is ordinary calamine lotion, to which has been added from 1 to 10 per cent of Duhring's coal-tar preparation :

℞	Phenol	℥ xv	Starch	
	Compound Tincture of Coal Tar (Duhring)	ʒss–v	Powdered Calamine	āā ʒv
	Zinc Oxide		Glycerin	ʒiiss
			Water, sufficient to make	℥ vj

Mix. Shake, and apply freely several times daily.

If the itching is exceedingly troublesome, one may resort to the

following combination, for the formula of which Sutton is indebted to his associate, Dr. Kanoky :—

℞	Menthol	ʒiss	Oil of Eucalyptus	℥ij
	Thymol	ʒij	Oil of Gaultheria	ʒiv
	Chloral Hydrate	ʒj	Alcohol, sufficient to make	℥viij
	Chloroform	℥ij		

Mix. Shake, and apply two or three times daily.

For the eradication of the thick, scaly patches in lichen planus hypertrophicus, numerous methods have been suggested, none of which are entirely satisfactory. Repeated freezing with **Carbon-dioxide Snow** is often beneficial, and **Röntgen Therapy** in an erythema dose (one sufficient to give rise to an erythematous reaction), or less, constitutes a reliable aid. The long-continued application, under rubber or oiled silk, of ointments containing considerable percentages of salicylic acid and tar occasionally results in a cure.

Wise[2] records successful application of **X Rays** in the cure of two cases of lichen planus of the glans penis, which had resisted other measures.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 175 ; [2]*Med. Rec.* 1914, i, 388.

LIP, CANCER OF. *K. W. Monsarrat, F.R.C.S.*

Beckman[1] writes a paper, entitled, "A Plea for Early Operation for Cancer of the Lower Lip." These growths are ideally situated for radical surgical treatment. The only proof of correct diagnosis is microscopic examination ; many cancers are first treated as specific ulcers. It is necessary to remove the lymphatic glands on each side at the primary operation, and the submaxillary salivary glands require removal also. If microscopic examination shows affected glands, a complete lymphatic dissection on the affected side of the neck is necessary, including all the glands and gland-bearing fascia. Butlin has pointed out the importance of the area underneath the sternomastoid muscle posterior to the submaxillary triangle. It does not appear necessary to remove tissue between the primary growth and the submental and submaxillary glands. When a dissection has to be carried out along the jugular, it is better to perform the operation in two stages. In removing the growth a quadrilateral section, including the full thickness of the entire lip, is removed, running down nearly to the point of the chin. An incision is then made from the lower angle of the quadrilateral parallel to the ramus of the jaw on either side, as far as is necessary to obtain enough tissue to close the defect. The entire flap should be well freed from the bone. If the skin remaining over the point of the chin is too long, it is shortened when the flaps are approximated, by taking out a small triangle at one or both ends of the incision. This is the technique when only a small portion of the lip is removed. If it is necessary to remove much, the primary incision is made in the same manner, but in addition to the incisions along the ramus of the jaw it is necessary to make others from the corners of the

mouth (*Plate XXXIV*). The suggestion of T. Clark Stewart, to incise through all the tissues except the mucous membrane, and then cut this ¼ in. higher, is valuable, as it provides sufficient mucous membrane to stitch over the raw surface of the lower lip. When the flaps are approximated, the lower lip is shorter than the upper, and also shorter than the skin covering the chin. These may be shortened by removing triangular pieces from the extremity of each incision. Beckman gives the following instructive table of cases verified microscopically :—

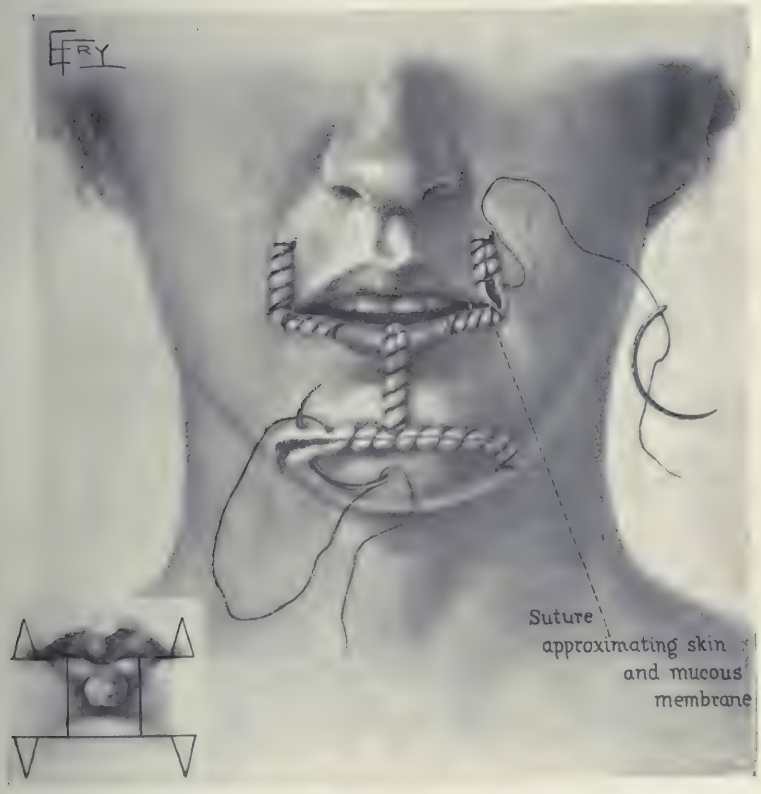
Group	Number	Traced	Not Traced	Cured	Not Cured	Per cent Cured
1. Primary radical operation	126	99	27	83	16	83·8
Glands involved ..	18	18	—	9	9	50·0
2. Late radical operation ..	25	20	5	14	6	70·0
Glands involved ..	12	12	—	4	8	33·3
3. Glands removed one side or incomplete	5	5	—	2	3	40·0
4. Local excision only ..	18	15	3	11	6	73·3

Bloodgood[2] writes a study of carcinoma of the lower lip, based on about 200 cases from the laboratory of surgical pathology of the Johns Hopkins Hospital. Of these, 15 were microscopically benign although clinically diagnosed as cancer, and treated by the removal of a V-shaped piece. In 18 cases the gross lesion was still what might be called a wart, but microscopically carcinoma was evident. In the remaining 167 cases it was either an ulcer or a wart, and microscopically a fully-developed carcinoma of the spinous-cell type, with few exceptions. The most frequent benign precancerous lesion is a burn from smoking. At the mucocutaneous border there appears a small depressed area, dark in colour and of leathery consistency. This cannot be picked off as a scab at first, but later the dead epithelium is detachable, and patients usually state that the first change they observed was a scab which could be pulled off. The lesion can be removed under local anæsthesia. It is then examined carefully under the microscope. If it shows distinct benignity there is, of course, no indication for the gland operation. If the lesion in the gross is a wart, and the microscope shows early carcinoma, the author's experience demonstrates that there is no necessity for operation on the glands. When, however, the section pictures a fully-developed carcinoma, the glands should be removed. The material investigated demonstrates that the results are equally good with an operation in two stages, and that except in very extensive carcinoma of the lower lip, the removal of the local lesion and of the glands in the neck need not be done in continuity or *en bloc*.

Of the 18 cases of malignant warts, 5 were treated by local excision, and there were no recurrences ; in the remaining 13 the operation consisted of the removal of the wart and of the glands of

PLATE XXXIV

CANCER OF LIP—BECKMAN'S OPERATION



Illustrating plastic operation for removal of a portion or the entire lower lip.

Kindly lent by the Mayo Clinic

the neck. Metastasis in the glands removed was never demonstrated in these cases.

A V incision is recommended for the local disease, except in extensive cases, in which a plastic procedure is necessary to restore the gap left by wide excision. In very extensive cases the excision of the local area and tissue in the neck should be *en bloc* ; but in some cases the extent of the local operation is enough for one sitting in view of the general condition of the patient. One then burns with the cautery the tissue passing from the local excised area into the neck, and at a later date performs the radical operation there. The glands which may be involved are a small chain running perpendicularly from the symphysis to the hyoid bone, one between the body of the jaw and the submaxillary salivary gland, and others below the latter. Then there is a chain extending from the submental to this submaxillary group, and from this to the tip of the parotid and down behind the internal jugular. An incomplete operation on the glands is really worse than none at all.

The chief hope of increasing the number of cures in cancer of the lip lies in educating the public and the profession to earlier intervention. Surgeons should study the results in their cases of cancer of the lower lip in which the glands showed metastases. Bloodgood's own investigations showed but 50 per cent of five-year cures. In a careful study he had found that in the early operations both submental and subparotid lymph-glands were left behind ; in recent operations the subparotid. He considers that it is impossible to remove these glands completely without the ligature and excision of the upper portion of the internal jugular vein behind which they lie.

References.—[1]*Collected Papers St. Mary's Hosp., Rochester, Minn.* 1913 ; [2]*Surg. Gyn. and Obst.* 1914, i, 404.

LIVER, ABSCESS OF. (*See* Amœbiasis.)

LIVER, CIRRHOSIS OF. *Robert Hutchison, M.D., F.R.C.P.*

Treatment.—Zypkin[1] describes cases to show the beneficial results obtained from the administration of **Keratin** in cases of cirrhosis of the liver. This treatment rests on the power of keratin to fix glutin, which is the chief chemical constituent of connective tissue. The keratin is prescribed in half-gram (7½-gr.) tablets, from five up to ten or more being given daily. As it is apt to cause diarrhœa, **Bismuth Salicylate** is given at the same time in doses of from 5 to 25 gr. per day.

Reference. [1]*Berl. klin. Woch.* 1914, 345.

LIVER, CONGESTION OF.

Chionanthus Virginiana widely used in America. *See p.* 6.

LIVER, SURGERY OF. *E. Wyllys Andrews, M.D. (Chicago).*

MacLaurin[1] reports on the removal of *hydatid cysts* of the liver in the Prince Alfred Hospital at Sydney. He uses the term ectocyst as advised by Buckley, as equivalent to adventitious cyst. In general, in his 70 reported cases he advocates a technique somewhat like that

of myomectomy for myoma of the uterus, namely, the removal of the cyst from the liver tissue and the suture of the surrounding capsule. The hydatid proper consists of a mother cyst composed of two thin cyst walls fused one with the other, the ectocyst, a laminated layer, and the endocyst, a granular layer. He differs from those who would make wide excisions of the liver tissue with the cyst, on the ground that this converts a safe operation into a very serious one. The ordinary operation of marsupialization, in small cysts, performed by a competent surgeon, is probably the most trifling in abdominal surgery, and the results are equal to those of any other operation. Why, therefore, deliberately go out of one's way to perform a dangerous operation, involving risk of hæmorrhage, which is well known to be troublesome in wounds of the liver? No objection can be found practically to marsupialization. In the 70 cases, 34 males and 36 females, only 3 were less than ten years old. There were 7 deaths, all in complicated cases. No simple case treated by marsupialization died. Of these cases, 12 had already been operated upon for the same trouble. In 19 cases the hydatid was suppurating, with 2 deaths: 4 cases had ruptured, and of these, 3 died. The best method of exposing the liver is to cut near the costal margin and, if necessary, resect a portion of a rib. It may even involve a transpleural incision through the diaphragm, but this is followed by no collapse of the lung. The diaphragm and cyst wall may be sutured together, and recovery is equally satisfactory.

Heinemann[2] discusses the operative treatment of multiple *metastatic abscesses of the liver*. This condition has been very unsuccessfully dealt with in the past, 150 cases, as reported by Hellström, having had but 3 recoveries, 2 with operation, a mortality of 98 per cent. The writer reports several cases operated upon by wide dissection, often including the costal margin. The pus foci were found scattered throughout both lobes, and were searched for by puncture and small incision. Puncture, drainage, or the insertion of drains through small incision or trocar puncture, in some cases made with the cautery point, give temporary relief, and success may follow the repetition of this procedure, if necessary, several times, until the lowest cavity has been drained. The operation is assisted by exploratory puncture in all directions with a small aspirator, after the liver has been exposed. No other measure except exploratory puncture can discover the abscesses, as they are deeply situated in the liver tissue.

REFERENCES.—[1]*Brit. Med. Jour.* 1914, i, 82; [2]*Berl. klin. Woch.* 1913, 2373.

LIVER, SYPHILIS OF. *Robert Hutchison, M.D., F.R.C.P.*

Since the introduction of the Wassermann test, many cases of disease in the liver in which the real nature of the pathological condition was previously unsuspected, are now recognized to be due to syphilis, and to be amenable to antisyphilitic treatment. Cheney[1] points out

that this is particularly true of cases of cirrhosis, and cites instances to show that syphilis of the liver may exactly simulate the ordinary picture of portal cirrhosis. He is of opinion that there is no way of telling which case of cirrhosis is syphilitic in origin and which is not, except by the blood reaction, as there may be nothing in the history or physical signs to lead one to a correct conclusion. He believes that syphilitic cirrhosis is a comparatively common form of hepatic disease, and that in all cases of cirrhosis in which the Wassermann test is positive, vigorous antisyphilitic treatment should be carried out.

Osler[2] calls attention to a group of cases of syphilis of the liver in which the splenomegaly and anæmia are so dominant that Banti's disease is simulated. In one of these the spleen had been removed under the belief that the patient was suffering from splenic anæmia. It is noteworthy that in one of his cases in which the disease was of the inherited variety, the Wassermann test was negative.

References.—[1]*Amer. Jour. Med. Sci.* 1914, ii, 157; [2]*Clin. Jour.* 1914, July, 462.

LIVER, TESTS FOR FUNCTIONAL ADEQUACY OF. *O. C. Gruner, M.D.*

A number of careful studies into this subject have appeared during the past twelve months. There are three main tests: (1) The use of carbohydrates; (2) The detection of lipase; (3) The use of phenol-tetrachlorphthalein. A case has been reported in which polycythæmia was noted (Mosse[1]) as a sign of destruction of the liver function. This is quite exceptional.

As all the studies of importance emanate from the Johns Hopkins Hospital, it is convenient briefly to survey the subject from the point of view of these papers. Bloomfield and Hurwitz,[2] from a careful consideration of the extrahepatic factors involved in the sugar-regulating metabolism, the influence of the ductless glands, the ability of other tissues than the liver to handle sugar, and the ability of the uninjured liver substance to compensate in disease, conclude that *sugars* are theoretically unsatisfactory as tests for the efficiency of the liver. Further, the nausea which is produced, the vomiting and diarrhœa which may follow, and the interference with the results from concomitant kidney insufficiency, constitute serious objections to the method. They conclude further that the clinical reports are at variance with any certainty of interpretation. They rightly point out that there is no fixed relation between the amount of disease in the liver and impairment of functional activity. The same authors have supported this opinion by a careful study of lactose tolerance in dogs whose liver was caused to necrose by the use of chloroform. In the light of the work from this hospital it is hardly useful to consider Hatiegan,[3] who used galactose, Wagner,[4] who used galactose and levulose, and of Arai,[5] who used levulose. In any case these authors admit that they cannot distinguish the kind of disease in the liver.

Whipple[6] studied the question of the *lipase* test both in man and in experimental animals. The lipase of the blood is found to be remarkably constant, and anatomical changes in the liver are at once followed

by a characteristic rise in the lipase content. This was found constant in cases of chloroform necrosis (*Fig.* 63). A definite rise above normal was found in nearly all cases of eclampsia, acute yellow atrophy, cholangitis, and abscess of the liver. Cirrhosis of the liver may be associated with subnormal lipase.

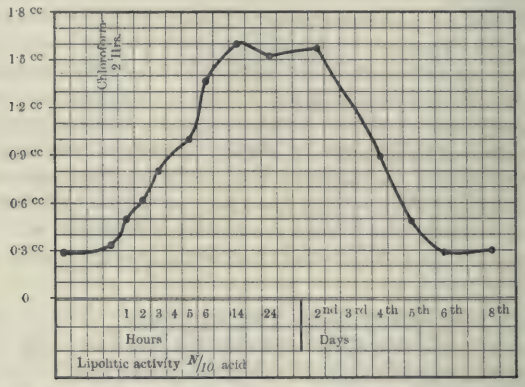


Fig. 63.—A chart showing the marked increase in the amount of lipase in the plasma produced by chloroform narcosis (Whipple). The increase is seen to be maintained for some days.

The accompanying table shows some of the results obtained. The method of analysis involves the use of about 10 c.c. blood. The action on ethyl butyrate is employed as the index of lipolytic activity.

LIPASE IN BLOOD.

Increased	Unaltered	Diminished
Chloroform anæsthesia (50 % of cases)	Chloroform anæsthesia (50 % of cases)	Cirrhosis of Liver
Eclampsia (50 % of cases)	Obstructive jaundice	Tuberculosis
Nephritis	Eclampsia (50 % of cases)	Sarcoma
		Diabetes

Phenoltetrachlorphthalein has been tested clinically as well as experimentally. The latter work was carried out by Whipple, Peigtal, and Clark,[7] with results which seemed to justify its employment upon man. Rowntree, Hurwitz, and Bloomfield[8] report upon the value of the test in man. It must be admitted that there are certain serious practical difficulties in the way. The drug is prepared in a special manner and given intravenously by gravity. The stools are collected for forty-eight hours and the urine for twenty-four hours. The analysis of the fæces is too costly and time-consuming to be of value anywhere but in a well-equipped hospital. The work is, however, well worth perusal.

REFERENCES.—[1]*Münch. med. Woch.* 1914, 1351; [2]*Johns Hop. Hosp. Bull.* 1913, 375; [3]*Wien. klin. Woch.* 1914, 358; [4]*Zeits. f. klin. Med.* lxxx, 1; [5]*Deut. med. Woch.* 1914, No. 16; [6]*Johns Hop. Hosp. Bull.* 1913, 357; [7]*Ibid.* 343; [8]*Ibid.* 327.

LUNG, ABSCESS OF. (*See* THORAX, SURGERY OF.)

LUNG, MASSIVE COLLAPSE OF. *J. J. Perkins, M.B., F.R.C.P.*

Massive collapse is the name given by Pasteur,[1] to whom we owe our knowledge of the condition, to the total deflation of a large area of the lung, in contradistinction to lobular collapse. The condition was first observed by Pasteur some years ago in cases of diphtheritic paralysis of the respiratory muscles, but has since acquired greater importance from his observation of a similar condition after operation. It is seen after abdominal operations most frequently, if not exclusively, is unilateral, and as a rule occurs on the same side as the operation. Observation shows, as so often happens, that it is by no means uncommon, and no doubt it has often been taken for post-anæsthetic pneumonia or pulmonary embolism. It will be seen from the symptoms, that on a cursory examination the condition of the lung might easily be mistaken for a pneumonic consolidation. It may follow the use of either ether or chloroform, and there is not necessarily sepsis of the abdominal wound or pain. Some time in the course of the first week after operation the temperature rises, the breathing and pulse become rapid, the patient becomes cyanosed, and there is usually thick, profuse expectoration, the importance of which latter symptom will appear later. The patient's distress may be very striking, and, the onset being sudden, may give rise to a suspicion of pulmonary embolism. In other cases, however, the symptoms are so little marked as to be almost latent ; the physical signs found on examination are quite distinctive and should prevent any mistake. The affected base is dull, the breath sounds are weak and tubular, but—and this is the essential point—the heart is widely displaced towards the affected side. This displacement has been repeatedly confirmed by *x*-ray examination, which also shows the diaphragm on the affected side to be immobile. The treatment to be adopted, besides expectorants to remove the viscid phlegm, should aim at restoring the respiration. The patient should be propped up, the abdominal bandages slackened, inspiration encouraged, and oxygen administered. Recovery follows as a rule, even after a period of danger, while the lung clears up and soon regains its translucency.

Divergent views are held as to the cause of the condition, and in spite of the explanations which have been offered, much remains obscure. Pasteur himself holds that inactivity of the respiratory muscles will in itself bring about collapse of the lung, even in the absence of all obstruction to the air entry. The normal aerated state of the lung is maintained as the result of a balance between the forces which lead to its expansion and the natural elasticity of the lung which tends to make it contract ; should the expansile forces be diminished or destroyed, the contractile forces get the upper hand and collapse follows. That this is possible must be conceded as a result of his observations on the condition of the lung in diphtheritic paralysis, in which he found a collapse not markedly different from

post-operative collapse. It is further an undoubted fact that in post-operative collapse the diaphragm on the affected side remains immobile, for which Pasteur offers the explanation of reflex inhibition from the peritoneum; but exactly why and how operative interference can lead to such inhibition, the wound remaining aseptic, cannot yet be explained. Though it is true that in a case of perfectly clean appendicectomy he found by the *x* rays almost complete immobility of the diaphragm, collapse of the lung was absent. Elliott and Dingley, on the other hand, found that the diaphragm moved in cases of peritonitis and appendicitis, but became immobile in pleurisy. We are then still in the dark as to the causes of the diaphragmatic immobility which is in some way an essential factor in the collapse of the lung. Elliott and Dingley[2] prefer to find the primary cause in the bronchitis and abundant viscid expectoration which is undoubtedly present, the collapse on this explanation being obstructive on the usual lines; their view, however, still leaves us with an insufficient explanation of the immobility of the diaphragm.

Tidy and Phillips[3] report a case which is very interesting in this connection, in which apparently lobar collapse followed acute pleurisy. It is true that no *x*-ray examination of the chest was made at the time, but the physical signs seem to allow of no other explanation. The patient suffered from acute pleurisy on the right side, with cyanosis and dyspnœa; the movement of the right side of the thorax was very slight and the air entry poor, while the heart was widely displaced to the right of the sternum. They favour the explanation of reflex inhibition of the diaphragm and lower intercostals on which collapse of the lung followed.

References.—[1]*Brit. Jour. Surg.* 1914, April, 587; [2]*Lancet*, 1914, i, 1305; [3]*Ibid.* 1245.

LUPUS ERYTHEMATOSUS.

(*Vol.* 1914, *p.* 513)—For a local application, **Carbon-dioxide Snow** is recommended.

LUPUS VULGARIS. *E. Graham Little, M.D., F.R.C.P.*

Meachen[1] has had satisfactory results with hypodermic injections of $\frac{1}{2}$ to 2 c.c. of a 1 per cent watery solution of **Copper Chloride.** The injections are made directly into the lupoid tissue, and cachets containing $\frac{1}{6}$ gr. of the same salt are given three times a day, concurrently with the injections.

X-Ray treatment discussed (*p.* 64).

Reference.—[1]*Brit. Med. Jour.* 1913, ii, 1005.

MALARIA. *Sir Leonard Rogers, M.D., F.R.C.P.*

J. G. Thomson and D. Thomson[1] record further work on the cultivation of the malarial parasite in confirmation of the original discovery of Bass and Johns. The malignant tertian parasite was grown twelve times and the benign tertian on three occasions. The optimum temperature was about 38° C. The benign tertian organisms show no tendency to clump, but in the case of the larger forms of the malignant tertian this is a marked feature, and accounts for their

disappearance from the peripheral blood, and tendency to block capillary vessels, producing serious cerebral symptoms if very numerous. The benign tertian parasite seldom produces more than sixteen spores, but the malignant tertian may form up to thirty-two. The morphology of the parasites in culture is similar to that seen in the blood. The sexual stages have not yet been cultivated.

J. W. W. Stephens,[2] on the strength of the examination of a single slide sent him by Major Kenrick, I.M.S., from the Central Provinces, India, describes what he thinks is a new malarial parasite closely resembling the benign tertian form, but with more delicate amœboid processes, of smaller bulk and slightly different appearance of the pigment.

David Thomson[3] discusses and illustrates some observations on the crescents in malignant tertian malaria and their flagellation, having worked at the subject with James at Panama. He thinks the crescents develop from a single asexual spore in the internal organs, and appear in the peripheral blood ten days after the spores they grew from were present, and that the total duration of the life of the crescent cannot be more than twenty days, the majority of them perishing within a few days of their entering the circulating blood. He does not believe that crescents ever revert to the asexual stage by parthogenesis, or that the male crescent ever flagellates in the circulating blood. All stages of development of crescents stain of a greyish colour with Giemsa, and not blue as in the asexual stage. On withdrawal of the blood the crescents begin to flagellate in four minutes, and may do so up to fifty minutes, from four to ten being extruded. S. Sen[4] discusses the etiology of malaria in Bengal, where he found no marked relation between the height of the spleen index and jungle, swamps, and drying-up rivers.

C. Fraga[5] discusses the changes produced in the liver by chronic malaria, and concludes that they are generally slight and easy of cure, being mainly congestive and functional. A. A. Myers[6] records a case of suppurative parotitis after malaria, necessitating opening of the abscess, with recovery.

Prophylaxis.—H. C. Wilson,[7] who is a fish expert, discusses the best methods of stocking tanks, borrow-pits, swamps, wells, paddy fields, etc., with larvicidal fish, and the drainage of small pools in order to prevent the breeding of malaria-bearing mosquitoes, and names the most useful genera and species. He suggests that the use of fine-meshed nets destroying such small fry should be prohibited in malarial places. The most useful genera are *Rasbora*, *Barilus*, *Haplochilus*, *Barbus*, *Therapon*, and *Polyacanthus*. E. C. Hodgson[8] has studied malaria in Madras city, and found very little in proportion to the extent of mosquito-breeding sheets of water. He thinks the water may be too hot for the larvæ to flourish in.

Malcolm Watson[9] discusses mosquito reduction as a preventive malarial measure, both on the basis of his own successful results in Malay peninsula and of other workers, which have previously been

dealt with in the MEDICAL ANNUAL. He thinks that even in rural districts the eradication of malaria by mosquito reduction is not so impossible as is generally supposed, and advocates drainage and agriculture after careful investigation of the local conditions by malarial experts, as is now being done on a large scale in India.

A. W. Bacot[10] recommends flake naphthalene for the destruction of mosquitoes in covered wells and cisterns. It is sprinkled on the water, or suspended above the surface, which prevents the water being flavoured by it. W. E. Buck[11] found that by applying to his body a solution made by adding one soupspoonful of a saturated solution of thymol in alcohol to a litre of water, the bites of mosquitoes were prevented.

D. Izar[12] and R. Nicosia have used with success Morgenroth's **Ethylhydrocuprein** in the treatment of malaria. One to 1½ grams are given daily in three powders at intervals of four hours, to avoid its toxic action, continued for five days. Deafness and disturbance of vision were only met with in one out of forty-nine cases. Izar also had a satisfactory result in a child with kala-azar. P. Baetge[13] has treated four cases of benign tertian malaria by intravenous injections of **Neosalvarsan,** 0·9 gram being given shortly before the expected attack of fever. The temperature fell promptly, and reached and remained normal. The parasites only remained in the blood for eight hours after the injection. He thinks the drug may supplement quinine in the treatment of malaria. F. W. Lamballe[14] finds cases of malaria not infrequently relapse in spite of prolonged treatment with quinine. In 1907 Beard foretold that the parasites of malaria would be readily destroyed by the enzyme **Trypsin.** Lamballe therefore tried this suggestion in twelve cases of relapsing malaria, injecting trypsin and amylopsin intramuscularly. The ferments were put up in sterile 1-c.c. capsules by Messrs. Fairchild Brothers and Foster, and do not lose their strength in a hot climate. Before injection the contents of the capsule should be diluted 1–5 with normal saline. In a few hours the temperature falls and improvement sets in, and the parasites may disappear after a single injection. In severe infections three injections may be necessary.

Salvarsan-Copper injections tried (*p.* 32).

REFERENCES.—[1]*Ann. Trop. Med. and Hyg.* 1913, 509 ; [2]*Ibid.* 1914, 119 ; [3]*Ibid.* 1913, 479 ; [4]*Ind. Med. Gaz.* 1913, 303 ; [5]*Rev. de Méd.* 1913, 816 ; [6]*Brit. Med. Jour.* 1913, ii, 1626 ; [7]*Ind. Jour. Med. Research,* 1914, 691 ; [8]*Ibid.* 1914, 702 ; [9]*Trans. Soc. Trop. Med. and Hyg.* 1913, 59, and *Glasgow Med. Jour.* 1914, i, 81 ; [10]*Brit. Med. Jour.* 1914, i, 15 ; [11]*Presse Méd.* 1914, 12 ; [12]*Berl. klin. Woch.* 1914, 385 and 453 ; [13]*Münch. med. Woch.* 1913, 2776 ; [14]*Med. Rec.* 1913, 928.

MANIC-DEPRESSIVE INSANITY. *Bedford Pierce, M.D., F.R.C.P.*

The striking changes in nutrition that accompany the different phases of manic-depressive insanity have been recognized for many years, and it has frequently been suggested that some toxic disturbance was an essential factor in the causation of the disease. The

periodic loss of appetite and weight, accompanied by constipation and general hebetude, indicate physical disorder; but whether this be secondary to the mental disease, or the cause of it, or merely associated with it, has not been cleared up.

Lewis C. Bruce[1] describes an attempt to demonstrate the presence of a toxæmia by means of the complement-deviation test. He argued "that if a toxin existed in the blood, it would probably be excreted in the urine, and that at certain stages of the disease process, a corresponding immune body would be found in the serum." Consequently the urine was used as an antigen and the serum as the immune body. He found that the complement-deviating power was not present when either the serum or the urine was obtained from a sane and healthy person, but there was a very marked deviation of the complement when both serums and urines were obtained from the same cases of manic-depressive insanity at different stages of the disease. The following conclusion was reached: "During the elevated period of the disease the complement-deviation substance in the serum was present in considerable amount, but as the excitement passed off and depression set in, the immune body in the serum became markedly less. On the other hand, the complement-deviating substance in the urine of these patients was extremely scanty during the period of excitement, but became markedly less during the periods of depression. . . . The suggestion is that during the excited period of the disease the defences of the body, in the form of the immune body in the serum, are sufficient to neutralize to some extent the action of the toxæmia which causes the disease; but whenever the defensive power is exhausted, the toxin overwhelms and paralyzes the nervous tissues, so that the outward manifestation is depression and, in some cases, even stupor."

The subject of manic-depressive insanity is discussed from a totally different point of view by Macfie Campbell,[2] who gives a careful account of the mental symptoms of three typical cases. The apparently incoherent conversation during the attacks of severe excitement is traced to its sources in the past life of the patient.

It is shown by psycho-analysis conducted when the excitement had partially subsided, that the mental symptoms exhibited in these cases take their origin from long-suppressed sexual conflicts and other secret troubles. He states that "the insight gained from these typical cases enables one to deal much more satisfactorily with many cases of acute excitement, where, in a setting of over-activity, talkativeness, and exhilaration, there occur many peculiar reactions, and where there is a florid development of peculiar ideas, which evidently represent the distorted symbolic expression of repressed trends. . . . In many cases of manic-depressive excitement the onset of the attack becomes intelligible in the light of a careful reconstruction of the whole situation out of which the attack has developed. . . . It is important to study closely the content of the utterances of the manic patient in order to understand the meaning of the situa-

tion leading to the attack. This line of investigation includes an accurate estimate of the equilibrium of forces which make up the patient's personality. . . . A thorough review of the above factors may put the patient in a better position with regard to the possibility of avoiding further attacks."

The last sentence raises a problem which at present is awaiting solution. Granted that by means of analysis and investigation an intelligent explanation can be given as to how it happens that certain statements are made during the excited phase of an attack, it does not necessarily follow that the attack would have been prevented had the past experiences been such as to render the train of thought in question impossible. The incoherent remarks of a delirious patient no doubt depend upon his mental make-up ; but we look upon the drug or other toxic agent as the chief cause of the delirium. Thus the problem is whether mental disorder is produced by physical or by psychical causes, or both acting together. It is probably a sound general principle to study carefully all aspects of the case, and whilst combating the toxæmia and the morbid bodily changes, not to omit to investigate the content and source of the mental symptoms. The removal of disturbing factors does much to shorten an attack of both excitement and depression, and attention to the mental and moral environment frequently prevents relapse.

Shaw Bolton[3] does not appear to favour the use of the term manic-depressive insanity ; but recurrent insanity and folie circulaire are considered under the head of high-grade amentia. " The common physical feature of these various cases is a more or less marked under-development of the cerebrum, associated with the absence of intra-cranial morbid appearances, and the common psychic feature is the entire or almost entire absence of dementia, unless this occurs as the result of senile or presenile involution of the cortical neurones, or in a small proportion of cases as the result of neuronic degeneration following excessive primary and direct toxæmia of the cerebrum."

An interesting commentary on the difficulty of ascertaining the factors of causation is obtained from cases quoted by Shaw Bolton.[4] " A certain patient gave as the cause of his first relapse his anxiety about his aged mother, who had recently become insane ; and his mother gave as the cause of her attack her anxiety about this same son, who had just developed his first attack of insanity. The son, again, as the cause of his first attack, which became obvious owing to a determined attempt to cut his throat, stated that he had begun to think he could not help it, as it was born in him, for his grandmother was like his mother in the fact that she had suffered from depression at times."

References.—[1]*Jour. Ment. Sci.* 1914, Apr. ; [2]*Rev. Neurol. and Psych.* 1914, May ; [3]*The Brain in Health and Disease*, 166 ; [4]*Ibid.* 185.

MEASLES. *E. W. Goodall, M.D.*

Mensi[1] examined the *blood* of 17 cases of measles, and found that during the eruptive stage there was almost always leucopenia and eosinopenia. Further, there was leucopenia for several days before

the rash came out. In 3 cases it persisted after the rash had disappeared. There was slight diminution in the number of lymphocytes during the eruptive stage. In 3 cases in which there was little or no leucopenia, the patient was suffering from a complication, in 1 case streptococcal stomatitis, in the other 2 bronchopneumonia.

J. Zahorsky[2] draws attention to a disease which often gives rise to trouble in diagnosis. It is known as '*roseola infantilis*.' It is very rarely met with over the age of three, and most of the patients are under two and a half years. The patient falls ill suddenly, with feverish symptoms; the temperature is usually high, and may range from 102° to 105°; it remains elevated for three or four days, at the end of which the rash appears and the temperature falls by crisis within a few hours. There is usually a morning remission. The child is very restless by night and drowsy by day. The rash consists of rose-red macules and papules, circular or elliptical in shape and 1 to 3 mm. in diameter. It is most marked on the trunk, especially the back, and on the limbs, especially the buttocks and thighs; it is scanty on the face. There are no catarrhal symptoms except congestion of the fauces. A macular exanthem may sometimes be seen on the palate just before or at the onset of the cutaneous rash, but Koplik's spots are not present. Vomiting and diarrhœa occasionally occur. There is no desquamation. The superficial lymph glands of the neck are very slightly enlarged in most of the cases. The disease is not contagious.

References.—[1]*Gaz. deg. Osped.* 1913, Nov. 16 (*Brit. Med. Jour. Epit.* 1914, i, 29); [2]*Jour. Amer. Med. Assoc.* 1913, ii, 1446.

MELÆNA NEONATORUM.—(*See* Hæmorrhagic Disease of the New-Born.)

MENSTRUAL DISTURBANCES.

Corpus Luteum in (*p.* 8); **Ovarian Extract** (*p.* 23).

MIKULICZ'S DISEASE. *Robert Hutchison, M.D., F.R.C.P.*

In the Medical Annual for 1911, p. 447, an account was given of the symptoms and the then state of our knowledge as to the pathology of this rare disease. Thursfield, in a recent clinical review,[1] has brought forward some later information on the subject, and deals critically with the previous literature. He says that it is possible to recognize at least eight groups of cases in which bilateral swellings of the salivary glands, either with or without an accompanying enlargement of the lymphatic glands, form the most characteristic symptom:—(1) A congenital, hereditary, or family affection; (2) 'Mikulicz's disease' proper; (3) 'Mikulicz's disease' with involvement of the lymphatic apparatus; (4) Leukæmia; (5) Tuberculosis; (6) Syphilis; (7) Gout; (8) Sialodochitis fibrinosa, intermittent or periodic salivary swelling. In addition, cases are met with from time to time which do not seem to belong to any of these groups.

Pathology.—"When we review the various types of disease in which symmetrical swelling of the salivary glands is the prominent feature, and consider their relationship to each other, it is clear there is no one underlying cause; the same clinical characteristics may be produced by a variety of infections. That the underlying cause is an infection was the view supported by Mikulicz himself. The association with inflammatory affections of the pharynx, conjunctivæ, and mouth; the characteristic histology of all cases of 'Mikulicz's disease' proper, consistent with a chronic irritation of the tissues and the general course of the disease, all point to the correctness of this hypothesis: but there is as yet no indication of the nature of the infecting organism, except in the tuberculous, syphilitic, and streptococcic groups. It would appear quite clear that the disease originally described by Mikulicz is, if not the same, at least very closely allied to the affection which involves the lymphatic tissues, and that in turn closely related to the true leukæmias. The histology, also, is very similar throughout; the round-cell infiltration of the tissues in the most benign cases strongly resembles that found in the most acute and rapidly fatal cases of leukæmia. A curious feature of the disease noted in many cases is the tendency of the swellings to diminish and even to disappear in the presence of an acute bacterial invasion, e.g., erysipelas or pneumonia. What may be the explanation of this phenomenon is quite unknown, but it is a well-recognized feature in leukæmia, in which disease the glands and the spleen often diminish remarkably in the course of a few days, to grow again as soon as the acute complication is past. The only other possible hypothesis is that the disease is a new growth, and this does not fit the facts nearly so well; in truth, it agrees only with the phenomena of the original type, in which it might be conceded as possible that the swellings are a benign tumour-formation. Further speculation in the absence of new facts is useless."

Prognosis.—"When there is no involvement of the lymphatic glands or spleen and no alteration in the blood, the disabilities of the affection seem to be confined to the disfigurement, and to a certain degree of occasional discomfort, from both of which the lapse of time, one to five years as a rule, releases the patient. When the lymphatic glands or the spleen are enlarged the outlook is more uncertain; of Howard's twenty 'pseudo-leukæmic' cases six died, and of the definitely leukæmic cases one alone survived more than six months."

Treatment.—On the whole the plan which seems to promise the best results is to remove any possible source of chronic infection, e.g., decayed teeth; to improve the general health; to give **Arsenic** in the largest doses that can be tolerated, and to treat the actual swelling with **X Rays**. Tuberculous and syphilitic cases must of course be treated by appropriate methods, but **Iodide of Potassium** has been found useful even in some cases in which there was no evidence of syphilis.

Reference.—[1]*Quart. Jour. Med.* 1914, *April*, 237.

MOUNTAIN SICKNESS. *Herbert French, M.D., F.R.C.P.*

'Puna,' as it is called in Bolivia, 'Soroché,' in Peru, are names given to illness produced by residence in mining districts at high altitudes. They are described by Ravenhill[1] from personal experience. The symptoms do not usually evince themselves immediately. The majority of newcomers have expressed themselves as being quite well on first arrival. As a rule, towards the evening the patient begins to feel rather slack and disinclined for exertion. He goes to bed, but has a restless and troubled night, and wakes up next morning with a severe frontal headache. There may be vomiting, frequently there is a sense of oppression in the chest, but there is rarely any respiratory distress or alteration in the normal rate of breathing so long as the patient is at rest. He may feel slightly giddy on rising from bed, and any attempt at exertion increases the headache, which is nearly always confined to the frontal region. On examination, the face may be slightly cyanosed, the eyes look dull and heavy, with a tendency to water, and the tongue is furred. The pulse-rate is nearly always in the neighbourhood of 100 or over; 150 was the highest in Ravenhill's cases. The temperature is normal, or slightly under; not often is there any rise of temperature at first, though it may occur towards evening. There is at times reduplication of the pulmonary second sound. The patient feels cold and shivery. The headache increases towards evening, as also does the pulse-rate; all appetite is lost, and the patient wishes to be left alone—to sleep if possible. Generally, during the second night he is able to do so, and, as a rule, wakes next morning feeling better; the pulse-rate has probably dropped to about 90; the headache is only slight. As the day draws on he probably feels worse again, the symptoms all tending to reappear on any exertion; if, however, he keeps to his bed, by the fourth day after arrival he is probably very much better, and at the end of a week is quite fit again.

The most prominent feature about this type of puna is frontal headache and extreme lassitude. Epistaxis or other hæmorrhages, dyspnœa, extreme vertigo, and other symptoms, may all be associated with puna, and may be so serious and pronounced as to obscure altogether the usual type of attack, which is not a very serious condition at the altitude in question. There are also wide divergencies from this normal type; and in Ravenhill's experience these divergent types of the disease may be grouped into two classes: those in which cardiac, and those in which nervous, symptoms predominate. He confirms the fact that *polycythæmia* is very pronounced in those who reside at high altitudes; the red blood corpuscles appear to proliferate very rapidly after arrival. The usual number of red cells at 15,400 ft., for Indians as well as white people, is between 8 and 9 million per c.mm.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1913, 313.

MOUTH-BREATHING. *J. S. Fraser, M.B., F.R.C.S.*

Warwick James[1] holds that mouth-breathing results in impaired development of the bones of the face. The maxillary bones are chiefly affected, resulting in faulty eruption of the teeth, or protrusion of the anterior teeth. Backward displacement of the mandible is another result, due to the weight of the pharynx and larynx dragging this structure downwards and backwards. In this connection, James reminds us of the well-known fact that patients under an anæsthetic breathe more freely if the mandible be pulled forwards. In children, gingivitis in the front part of the mouth is constant in mouth-breathers, and is followed by pyorrhœa alveolaris. Caries of the teeth is frequently seen. Even if controlled during the daytime, the persistence of mouth-breathing at night is only too common, as evidenced by a dry mouth upon waking.

Treatment usually consists in operative measures, followed by breathing exercises, but even then failure is often due to the persistence of a habit which, although controlled during the day, recurs at night when voluntary effort is impossible. To obviate this, narrow pieces of rubber strapping may be placed across the lips and a four-tailed bandage applied. These, however, cause much discomfort. James has devised an apparatus which consists of a wire frame, over which dental rubberdam is stretched (*Plate XXXV, Figs. A, B*). The frame is made to a model obtained by taking an impression of the outer surface of the teeth and gums. When in use it is placed inside the lips and cheeks, and rests upon the outer surfaces of the teeth and gums. It should be sufficiently large to extend back to the second premolars, so as to be steady when in position. As a rule the apparatus is worn only at night, but in small children it may be used in the daytime, to prevent thumb-sucking, a habit most conducive to mouth-breathing. Parents may be assured that there is no danger of the apparatus being swallowed. James believes that his invention may be regarded as a means of determining the necessity for operation or otherwise. Chronic nasal catarrh is often markedly improved, and in some cases entirely removed by wearing the apparatus, the use of which must continue until normal nasal respiration is established.

REFERENCE.—[1]*Clin. Jour.* 1913, Nov. 490.

MUMPS. *E. W. Goodall, M.D.*

ETIOLOGY.—M. H. Gordon[1] records the results of certain experiments made with the view of ascertaining the exact cause of mumps, which go to show that the virus of mumps is a filter-passer.

The same report contains an account of twelve cases of a fatal illness of children, occurring during the period May to September, 1913, chiefly in the neighbourhood of St. Bartholomew's Hospital. The outstanding features were pyrexia, collapse, diarrhœa, and vomiting, with symptoms of meningeal, if not cerebral, irritation, and a rapidly fatal termination. As the changes found in the cord microscopically,

PLATE XXXV.

WARWICK JAMES'S APPARATUS FOR PREVENTION OF MOUTH-BREATHING

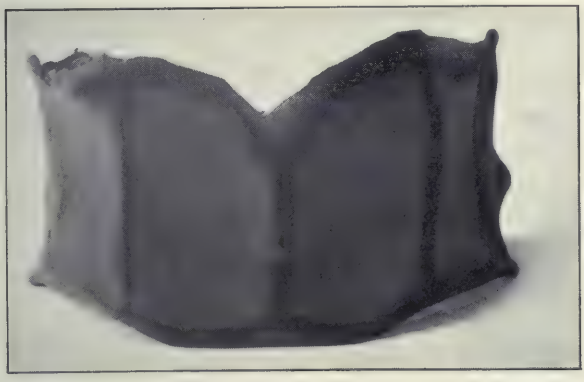


Fig. A.

Fig. B.

Illustrations kindly lent by Mr. James

resembled those which had been observed in the cords of monkeys that succumbed to intracerebral injection with the salivary filtrate from cases of mumps, the parotids were examined in all the cases but one, and foci of acute interstitial inflammation found. There was also enlargement of the mesenteric lymphatic glands and, in some of the cases, swelling of the lymphoid tissue of the mucosa of the ileum, cæcum, and colon. The experimental results of the injection into monkeys of emulsions of portions of the central nervous system and of the parotid glands were negative. There does not appear to have been any evidence that the disease was infectious.

REFERENCES.—[1]*Rep. to Local Gov. Bd. on Public Health, etc.*, New Series, 1914, No. 96.

MURMEKIASMOSIS AMPHILAPHES.

Sir Leonard Rogers, M.D., F.R.C.P.

A. J. Chalmers and J. B. Christopherson[1] describe and illustrate under the above term a case of extensive warty growth involving the side of the face, extending to the tongue and pharynx, and damaging one eye, in a native boy seen in the Sudan. They believe it was due to an organism which they propose to name *Cryptococcus myrmeciæ* (Chalmers and Christopherson). The wart on the side of the face was removed and did not recur, so they do not think it was a malignant growth.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1914, 129.

MYASTHENIA GRAVIS.

(*Vol.* 1913, *p.* 353)—In this desperate disease any hope is welcome. Taylor found benefit from prolonged administration of **Thyroid Extract.**

MYCOSIS FUNGOIDES. *E. Graham Little, M.D., F.R.C.P.*

A discussion on this subject at the Royal Society of Medicine, opened by Sequeira,[1] contributed some opinions of interest as to etiology and treatment. The disease is considerably commoner in males than in females, and especially between the ages of forty and sixty. The social position of patients is usually better than that of the hospital class, so that it is commoner in private practice. Two stages of the affection are usually distinguished, that of pre-tumour formation, and tumour development. Of the former phase there are three principal clinical varieties, according as the onset is accompanied by: (1) Pruritus; (2) The appearance of a polymorphic eruption, consisting of urticarial plaques or patches of a dry seborhœa-like type, but with pronounced infiltration of the patches; or by (3) A general erythrodermia, with the result that the whole body may become a brick red, the '*homme rouge*' of French authors. Or the tumour formation may come on without any preliminary stage, constituting the 'mycosis fungoides, tumeurs d'emblée' variety of French writers. Or there may be, as in pityriasis rosea, a herald patch preceding the general development of the disease by some considerable period. Blood examinations in numerous cases

yielded no characteristic signs. Metastases in deeper organs than the skin occur, but are on the whole rare.

The duration of the disease depends greatly on the clinical variety which may be present, the early advent of tumour being of bad prognosis; but instances are on record in which the patient has survived for thirty-five years after the appearance of the initial symptoms. The cause of death is usually exhaustion following protracted sepsis, but not infrequently some intercurrent disease such as pneumonia or empyema may hasten the end. General opinion was in favour of the view that mycosis is a disease *sui generis*, and not simply a phase or stage of other diseases such as leukæmia or Hodgkin's disease. **X-Ray** treatment appears to exercise a most remarkable effect in checking the itching of early stages, and the tumour formation in later development, but it remains doubtful whether a curative effect has been established as resulting from this or any other treatment. The diagnosis of this from other diseases is often extremely difficult, and reliance cannot be placed on any individual factor, but on a review of histological as well as clinical evidence.

REFERENCE.—[1]*Brit. Jour. Derm.* 1914, 213 and 249.

MYOPIA. *A. Hugh Thompson, M.D.*

Heredity.—J. A. Wilson[1] contributes an interesting paper, founded on 1500 cases of myopia. Among these there were nearly twice as many females as males, and there was clear evidence, either direct or collateral, of heredity in 58 per cent. The proportion in which such evidence could be obtained was nearly the same for the higher and lower degrees of myopia, and also for various types of occupation. The influence of near work is not denied, and Tscherning's statistics are mentioned. He found about twice as many myopes among Danish conscripts of the educated class as among those of the uneducated; but as is well known, the myopia among the educated classes is mainly of low degree, whereas high myopia occurs indifferently in all classes. "It may be said that when the myopia is high the intensity of heredity is great, and that when the myopia is low the impulse of heredity has been less, and that near work or other suitable environment has been necessary for the production of this variety, or to enable hereditary tendencies to become manifest. In the absence of this near work or environment, the factor may lie dormant, skip a generation, or be only partially or fitfully expressed." The paper contains some genealogical tables which should be referred to by anyone interested in heredity. The transmission of myopia cannot be shown to conform to Mendelian laws.

Education of High Myopes.—An important paper by Harman[2] gives a further account of the myope classes established by the London County Council (*see* MEDICAL ANNUAL for 1912, p. 473). Besides myopes, children with defective vision from various other causes, principally keratitis, superficial and interstitial, are admitted to these

classes. The degree of myopia qualifying a child for admission depends upon his age; a child of seven, for instance, with 5 D of myopia would be a suitable case, since he is at the outset of his school life, whereas an older child, with as much as 8 or 9 D with healthy fundi, might do as well or better with a modification of the ordinary school curriculum. As to the classes themselves, they should not be associated with the blind schools, since in much of the school work the myopic children can take the same part as the others. The success of these classes depends in large measure on the intelligence and initiative of the teacher. The classes should be small, in order to ensure individual attention, and the corrected vision of each child should not be less than $\frac{6}{18}$, or at the least $\frac{6}{24}$. Those with vision worse than this should be educated at a school for the partially blind. The paper is well worth the study of all those interested in school hygiene. It may be added that although the London County Council has set an excellent example by the establishment of myopic classes, the range of their usefulness is at present very restricted, as the need for them among the London school children alone has only as yet been met in a very small proportion of cases.

REFERENCES.—[1]*Brit. Med. Jour.* 1914, ii, 393; [2]*Proc. Roy. Soc. Med.* (*Ophth. Sect.*), vi, 146.

MYOSITIS OSSIFICANS. *F. W. Goyder, F.R.C.S.*

Morley,[1] as a result of experimental research, and treatment consequently adopted, concludes: (1) The condition is due to migration of osteoblasts into adjacent contused muscle and blood-clot, after destruction of the periosteum and loss of its function as limiting membrane to the growth of bone. It is essentially the same process as callus formation. (2) The condition may be produced experimentally in animals by reproducing the same mechanical conditions by an aseptic open operation. (3) Simple excision is usually, though not invariably, followed by recurrence. (4) Conservative treatment condemns the patient to a long period of disability, which may occasionally be permanent. (5) Excision, combined with grafting of deep fascia on to the denuded surface of bone, gives the best prospect of rapid and complete recovery, and is urged for all cases not complicated by ossifying peri-arthritis.

Fay[2] says that so far as can be determined, the development of bone in masses of muscular tissue resembles its formation in the repair of fractures more closely than it does any other process in which bone is formed; but the number of traumatic bone formations in the free musculature is to the number of those attached to the bone as three to two, and it is difficult to account for the absorption of the periosteal attachment in three-fifths of the cases. Again, if new bone were formed from the periosteum, the osteoperiosteal angle should be the first to show new bone formation, whereas radiograms demonstrate that it often appears there last. Hence he does not regard separation of the periosteum as an essential factor. Operation should be limited

to those cases where function is interfered with, and if it is not performed till there is 'ripening of the callus,' recurrence will not take place. This time occurs when the radiographic image agrees in size with the palpable mass and the clear dark outlines of the shadow indicate that the process is at a standstill.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 1475; [2]*Surg. Gyn. and Obst.* 1914, ii, 174.

NÆVUS FOLLICULARIS KERATOSUS.

E. Graham Little, M.D., F.R.C.P.

White[1] coins this new name to describe a very peculiar eruption of follicular keratosis, restricted to an area 3 in. wide, and extending halfway round the thorax on the right side from the angle of the scapula to the nipple, a typically zoniform distribution. The patient was a man of 24, and the disease had commenced fourteen years previously and had continued to extend. Microscopic examination established its character as a follicular keratosis, with no sebaceous element. The condition does not appear to have been described before. The treatment adopted was to **Excise** the whole diseased area.

REFERENCE.—[1]*Jour. Cutan. Dis.* 1914, 187.

NÆVUS ZONIFORMIS. *E. Graham Little, M.D., F.R.C.P.*

The term nævus is used in dermatology with the wider meaning of any congenital malformation of the skin, not only vascular, a restriction which is practically confined to British and American medical literature. Adamson[1] has some useful observations on this group of diseases. Nævi, though more usually present at birth, may not be apparent until later in life, and their advent may be delayed until puberty, or even until middle age. They may disappear spontaneously, and they are frequently associated with other congenital defects. To a group with a special distribution in lines or zones, usually unilateral, the name 'zoniform' is conveniently given, as recalling the distribution of herpes zoster or zona. Unilateral verrucose nævi are the most characteristic form of this class; but the name should not be restricted to this type only, and should be extended to include certain pigmentary forms, the affections known as angioma serpiginosum, and lymphangiectodes, and some at least of the leiomyomata.

REFERENCE.—[1]*Brit. Jour. Derm.* 1914, 379.

NASAL ACCESSORY SINUSES. *J. S. Fraser, M.B., F.R.C.S.*

MacNab[1] believes that it is generally admitted that the operative treatment of accessory sinus disease is not universally satisfactory. In a number of cases absolute cure can be obtained by **Ionization.** He gives a description of the apparatus employed, but no illustrations. (*See also* p. 73.)

Frontal Sinus.—The anterior end of the middle turbinal is removed under local anæsthesia, and the anterior ethmoidal region curetted to allow of the easy entrance of the cannula. The fronto-nasal duct may

require dilatation. The sinus is now washed out and the patient allowed to rest for ten days. The insulated cannula is then passed, pus blown out, and the sinus washed out with sterile water and irrigated with a 1 per cent solution of zinc sulphate. The patient now lies down on a couch, and the negative electrode is bound to his arm. The patient's head is bent over the end of the couch, and the positive electrode is passed so that it projects only 1 mm. beyond the end of the cannula. Indiarubber tubing is now connected to the cannula, and the zinc solution allowed to flow in. The current is next turned on, and the strength regulated by the feelings of the patient (up to 12 ma.). The sitting lasts ten minutes.

Maxillary Antrum.—The sinus is explored with the insulated Lichtwitz trocar and cannula, pus is blown out, and the cavity irrigated—first with boiled water and then with zinc solution. The platinum electrode is now passed along the cannula, the rubber tubing fixed, and the zinc solution allowed to enter. The current is next turned on, and the head is changed into various positions, so that all the lining membrane is brought in contact with the ions. The séance lasts for fifteen minutes.

Nasal Mucous Membrane.—The cavity of the nose is carefully cleansed with weak peroxide, followed by boiled water, and finally by the zinc solution. The choana is plugged by means of a finger stall attached to a straight Eustachian catheter; to the proximal end of the catheter a small tap is fixed, with two inches of rubber tubing. This apparatus is filled with water so as completely to block the choana. The patient's head is inverted, and the nasal cavity filled with the zinc solution through a large vulcanite speculum. The platinum electrode is immersed in the solution. MacNab has found this method of treatment useful in cases of ozæna.

MacNab states that all electrodes should be soldered on to the cable, as any break in the current is felt severely by the patient. If ionization is going to do good in a given case, the improvement will begin after two applications. MacNab claims success in the treatment of catarrhal and obstructive lesions of the Eustachian tubes, as well as in chronic suppurative otitis media, but has had no good results in cases of otosclerosis.

Frontal Sinus Suppuration.—Watson Williams[2] holds that an efficient **Intranasal Operation** is to be preferred to external operation on the frontal sinus, unless there are symptoms of ocular or intracranial complications, or of osteomyelitis. Intranasal operations were first performed in 1890. In these, attempts were made to enter the sinus internal to the middle turbinal, which were not very successful and were sometimes fatal, from injury to the cribriform plate. In 1905 the intranasal operation was revived by Fletcher-Ingals and Segura, who aimed at enlarging the natural frontal sinus ostium. Ingals has operated on fifty cases, with only one death, from meningitis.

The ethmoid cells are not strictly confined to the ethmoid bone, the agger nasi on the upper part of the inner surface of the nasal process

of the superior maxilla usually containing an air-cell. The lachrymal and nasal bones close those anterior ethmoidal cells which run in front of the fronto-nasal duct. The frontal sinus ostium is a bony ring, bounded in front by the posterior margin of the nasal crest, which forms the sloping floor of the sinus in front of the ostium. The middle turbinate descends from the under surface of the cribriform plate and forms the inner boundary of the anterior ethmoidal cells. We thus tend to avoid injury to the cribriform plate by retaining the middle turbinal and restricting all operative measures to its outer side. The anterior border of the middle turbinal lies in front of the anterior end of the cribriform. The width of the potential passage to the frontal sinus between the middle turbinal and the lachrymal bone varies in the adult from 7 to 12 mm. at its narrowest part at the level of the inner canthus. The lachrymal duct lies below the field of operation, but the lower level of the sac corresponds to the agger nasi.

Williams's intranasal operation on the frontal sinus is performed under either local or general anæsthesia, and is carried out as follows: (1) With small angular ethmoidal forceps engage the anterior margin of the middle turbinal at its point of attachment to the outer nasal wall. Cutting through this, the forceps enters the anterior ethmoidal cells in front of the frontonasal passage. (2) Keeping to the outer side of the vertical plate of the ethmoid, clip away all the agger cells and the other anticonchal cells right up to the nasal crest. (3) The anterior ethmoid cells lying behind or above the frontonasal duct are now removed by the forceps. (4) The bougies are then passed into the sinus so as to gauge the size of the fronto-nasal channel thus formed: usually No. 18 or 19 will enter —No. 19 has a diameter of ¼ in. If such a large bougie will not enter, the bone corresponding to the nasal crest may be shaved away by the sliding cutting-forceps of the author. (5) With the small forceps, which now enters freely, the projecting walls of any ethmoidal cells which remain may be clipped away. (6) The sinus is well lavaged at this stage, and finally the anterior end of the middle turbinal may be removed (*Plates XXXVI, XXXVII*).

Fig. 64.—Williams's frontal-sinus operation. Sullivan's raspatories. (Vacher's are very similar.)

The after-treatment consists in lavage of the sinus with saline solution and weak peroxide of hydrogen, followed by colloidal silver. The passage of the largest bougie the canal will take comfortably should be repeated at short intervals to prevent adhesions. The use of vaccines has to be considered. Watson Williams has operated on 51 cases, with 1 death, which was not due to the frontal-sinus operation. In 3 cases external operation had to be performed subsequently.

Acute Frontal Sinusitis.—Tilley[3] states that retention of inflammatory products may be due to (1) Great swelling of the nasal mucous membrane, especially of that covering the concavity of the

PLATE XXXVI.

INTRANASAL OPERATION FOR FRONTAL SINUS SUPPURATION

Fig. A.—Removal of anterior margin of middle turbinal.

Fig. B.—Opening up anterior ethmoidal dagger cells.

(Kindly lent by Dr. P. Watson Williams.)

PLATE XXXVII.

INTRANASAL OPERATION FOR FRONTAL SINUS SUPPURATION—*continued*

Widening the fronto-nasal duct with curved sliding cutting forceps.

Fig. D.—Skiagram showing 6 mm. (No. 19 French Scale) bougie entering well into the sinus after reduction of the nasal crest by burring.

Kindly lent by Dr. P. Watson Williams.

PLATE XXXVIII.

MR. HERBERT TILLEY'S INTRANASAL OPERATION FOR EMPYEMA OF THE FRONTAL SINUS

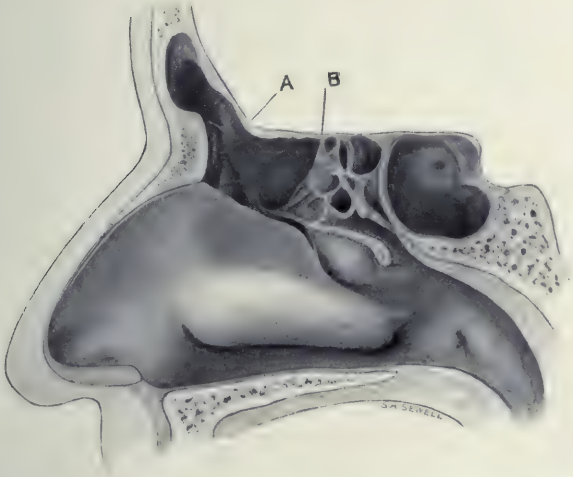


Fig. A.—Appearance of anterior ethmoidal region after removal of the anterior cells formerly occupying the space between A, B.

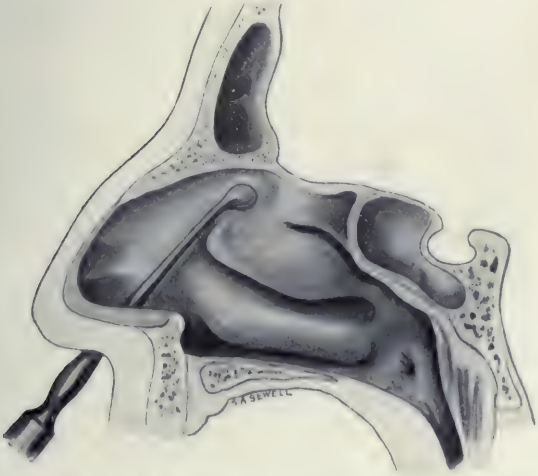


Fig. B.—Indicates the site where access is gained to the anterior group of ethmoidal cells.

Drawings kindly lent by Mr. Herbert Tilley

middle turbinal; (2) An abnormally large anterior end of the middle turbinal; (3) A deviation of the upper part of the nasal septum; (4) Anterior ethmoidal cells which obstruct the frontonasal canal by encroaching on the floor of the frontal sinus. The treatment consists in raising the head and shoulders on a pillow; administration of **Calomel,** followed by a **Saline Aperient**; 10- to 15-gr. doses of **Acetylsalicylic Acid** three or four times daily; the application of **Cocaine** and **Adrenalin** on a cotton-wool mop every two hours, with scarification of the anterior end of the middle turbinal and lavage of the sinus with the aid of a fine cannula (this is not always possible). If acute symptoms of retention persist, the middle turbinal should be removed, together with any obstructive anterior ethmoidal cells. Tilley has no experience of Sondermann's suction apparatus, or of Brünings' **Light Head-bath.** [The writer can vouch for the efficacy of the last mentioned in several acute cases. — J. S. F.]. When acute symptoms persist in spite of the above measures, and especially when swelling and œdema appear in the eyelid, an external operation on the frontal sinus is called for.

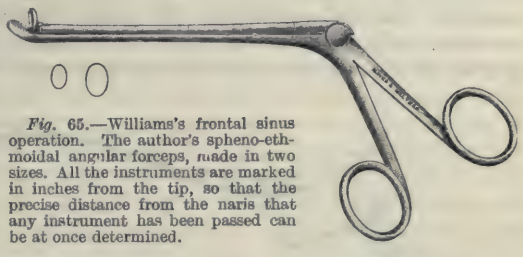


Fig. 65.—Williams's frontal sinus operation. The author's spheno-ethmoidal angular forceps, made in two sizes. All the instruments are marked in inches from the tip, so that the precise distance from the naris that any instrument has been passed can be at once determined.

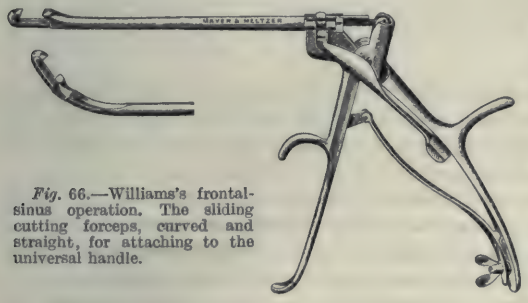


Fig. 66.—Williams's frontal-sinus operation. The sliding cutting forceps, curved and straight, for attaching to the universal handle.

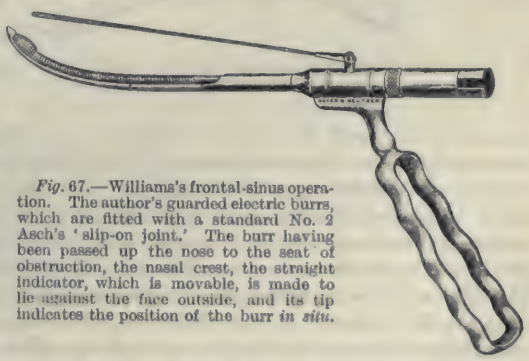


Fig. 67.—Williams's frontal-sinus operation. The author's guarded electric burrs, which are fitted with a standard No. 2 Asch's 'slip-on joint.' The burr having been passed up the nose to the seat of obstruction, the nasal crest, the straight indicator, which is movable, is made to lie against the face outside, and its tip indicates the position of the burr *in situ*.

Mosher says that in 25 per cent of skulls the frontonasal canal is continuous with the infundibulum, while in 50 per cent it opens separately into the middle meatus. Tilley points out that the eth-

moidal labyrinth is divided into an anterior and posterior group of cells by a thin diagonally placed plate of bone, which is limited externally by the os planum of the ethmoid and internally projects into the nasal cavity and forms the middle turbinal body. In some cases an anterior ethmoidal cell (bulla frontalis) projects upwards anteriorly into the floor of the frontal sinus. The cell of the agger nasi is often present in the anterior and upper third of the uncinate

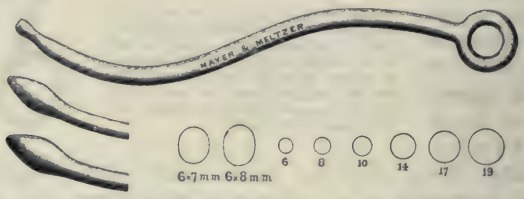


Fig. 68.—Williams's frontal-sinus operation. The author's frontal-sinus bougies, two-thirds actual size: above, the round bougie; below, the swan-head ends. The sectional area of different sizes is also shown. Assuming the normal fronto-nasal duct to be 2 mm. wide, the passage of a 6 by 8 mm. bougie shows that the duct has been enlarged twelve times.

process, and is covered by the anterior attachment of the middle turbinal. The frontal bulla and the agger cell frequently narrow the entrance to the frontal sinus. The normal position of the ostium of the frontal sinus is below the level of the cribriform plate.

Chronic Frontal Sinus Suppuration.—Tilley admits that only a certain percentage of cases can be cured by **Intranasal Operation** (*Plate XXXVIII*). We may look for success if the frontal sinus is of moderate size, free from bony septa, and if the frontonasal canal permits of probing and enlargement. Information on these points can only be

Fig. 69.—Williams's frontal-sinus operation. The author's flexible metal frontal-sinus cannula.

gained beforehand by a good skiagram. Intranasal operations have two advantages over the external route: absence of an indelible scar, and great reduction in the length of the after-treatment. Morphia, gr. $\frac{1}{6}$, and atropine, gr. $\frac{1}{100}$, are administered three-quarters of an hour before general anæsthesia; cocaine and adrenalin are also applied to the middle meatus on a small swab. Immediately before operation the frontal sinus is thoroughly washed out with normal saline solution. The middle turbinal is now removed with scissors and snare, and the anterior ethmoidal cells are entered opposite and external to the anterior attachment of the turbinal. For this purpose Tilley uses a small mastoid gouge on a long shank. This instrument is directed outwards till it meets the lachrymal bone and the os planum of the

ethmoid. Its presence in the region of the lachrymal bone can easily be detected by the surgeon placing a disengaged finger over the inner canthus. Gentle downward pressure with the instrument now destroys the bulla and lower anterior cells. Semi-detached fragments are removed with suitable forceps. It should now be easy to pass a probe into the frontal sinus. Finally, an effort should be made to enlarge the ostium of the sinus with a burr. It is safer to enlarge the ostium by destroying the outer half of its circumference rather than the inner. Two days after operation the nasal cavity should be sprayed with 5 per cent cocaine, and the frontal sinus irrigated with a warm alkaline solution containing hydrogen peroxide. This treatment is carried out daily for ten days. Exuberant granulations can be checked by the application of nitrate of silver. Tilley has practised this operation for the past three years without a fatality.

Fronto-ethmoidal Trephining.—Iwanoff[4] holds that the frontal sinus is scarcely ever diseased alone ; but that the ethmoidal cells or antrum (or both) are practically always affected. Before operating on the frontal sinus, Iwanoff injects cocaine along the line of incision. He opens the floor of the sinus first of all, and if the cavity be small he leaves the anterior wall in situ but removes the mucous membrane from the whole of the sinus. Iwanoff believes that after the radical frontal operation the cavity fills with blood-clot, which organizes into granulation tissue and finally becomes a solid mass of bone. It is important to note that of the twenty-three cases recorded by Iwanoff, seven had to be operated upon three times. The dangers of the operation are venous infection and osteomyelitis, and meningitis from lymphatic infection. Hajek states that the external operation is indicated in all cases of orbital and intracranial complication and those in which the bony walls are affected ; and in chronic uncomplicated cases, only where intranasal treatment fails to relieve profuse discharge and severe pain which prevent the patient working. Some observers have asked if the radical operation is not more dangerous than the disease, but Iwanoff agrees with Killian that long-continued conservative treatment has a bad affect upon the mental outlook of the patient. He holds that failure of conservative treatment to lessen purulent discharge and recurrence of polypi are indications for the radical operation.

Technique of the Radical Frontal Sinus Operation.—Luc[5] performed his first external operation on the frontal sinus in 1893. In his first 20 cases he had, as a rule, trouble with drainage. In 2 cases a brain abscess formed, in 1 osteomyelitis occurred, and 1 patient died from meningitis. Since 1907, Luc has performed a modified Killian operation in 10 cases. He removes the floor of the frontal sinus, and thoroughly clears out the ethmoidal region, to provide free drainage into the nose. He operates, as a rule, under local anæsthesia. He does not remove the anterior wall, nor does he follow up a large orbital extension, if this exists. Before curetting the sinus he places a pledget of cotton-wool, soaked in cocaine, in the cavity for five

minutes. The curetting of the cavity is of course performed ' blind.' If the sinus is small, the external incision is entirely closed ; but if it extends to the external angle of the orbit, Luc puts in a drain here for a short time. If the sinus extends high up on the forehead, Luc performs the typical Killian operation. In 3 of his last 10 cases the frontal wound had to be reopened on account of retention of pus.

Porter[6] believes that his is the first recorded case in which recovery has occurred from *osteomyelitis of the frontal bone* following the Killian operation. The original operation on the right frontal sinus was performed in May, 1912, and the wound healed by first intention. Three weeks later the upper eyelid became swollen ; the wound was reopened and pus evacuated. The second operation was performed in October, 1912, and a sinus was traced to a hole in the septum between the two frontal sinuses, from which pus issued. Killian's operation was therefore performed on the left frontal sinus. This was followed in a few days by swelling and pain over the left upper eyelid. A month later the swelling had become more marked. The wound was reopened and a sequestrum removed, but œdema, pain, and fever continued. Ten days after this last operation, an extensive removal of the left half of the frontal bone was carried out ; the diseased bone appeared glazed on the surface and was very soft and vascular. The dura beneath appeared healthy. Healing took place gradually, and was undoubtedly assisted by the administration of a vaccine.

Vacuum Diseases of the Maxillary Sinus.—Lynch[7] holds that a partial vacuum may be created in the antrum by the closure of the ostium, similar to that produced in the tympanic cavity by closure of the Eustachian tube. He has had fourteen cases of this kind within eighteen months, and all the patients gave a history of a previous attack of rhinitis. In some cases the antrum was slightly hypersensitive on pressure over the base of the nasal process of the superior maxilla. Proof puncture was followed by immediate relief, but in some had to be repeated. Lynch gives the following list of symptoms caused by closure of the antral opening : pain in the eye, or in the region of the naso-antral wall, or in the teeth ; nasal reflex neuroses, sneezing, etc. ; nasal tone of voice. Nasal examination, transillumination, and *x* rays give a negative result.

Intranasal Operation for Suppuration in the Maxillary Antrum.—Levinstein[8] states that statistics show that 80 per cent of cases of antral suppuration are cured by intranasal opening. The usual method is to remove the anterior end of the inferior turbinal under local anæsthesia, and then to bore through the inner wall of the antrum and enlarge the opening with bone-cutting forceps. The stages of Levinstein's operation are as follows : (1) The nasal mucous membrane is painted with 20 per cent. cocaine with a little adrenalin ; (2) Two c.c. of 1 per cent novocain with 15 drops of adrenalin are injected into the mucosa of the outer wall of the inferior meatus and floor of the nose ; (3) The mucous membrane of the outer wall is incised with Freer's angled knife parallel to the anterior end of the

inferior turbinal: the cut extends down to the floor of the nose; (4) The mucoperiosteum is raised with Freer's elevator from the outer wall of the inferior meatus; (5) The detached mucoperiosteum is cut with scissors as near as possible to the attachment of the inferior turbinal, and the flap turned back out of the way against the septum; (6) The inner wall of the antrum below the level of the inferior turbinal is now removed with chisel, trephine, or forceps. The anterior part of the inner wall of the antrum must be completely removed, along with any projecting ledge of bone between the nasal and antral floors (this part of the operation is best performed with a bent gouge); (7) The mucous-membrane flap is removed over an area which corresponds to the hole made in the inner wall of the antrum. After-treatment by lavage is on the usual lines.

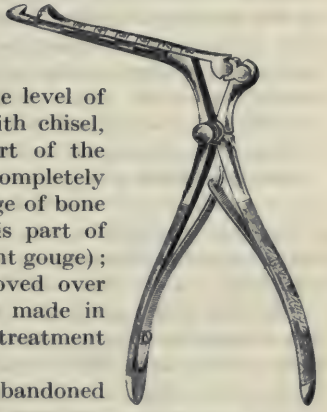


Fig. 70.—Forceps for enlarging the new opening from the inferior meatus into the antrum.

Watson Williams[9] has practically abandoned extranasal operation for chronic antral suppuration since his intranasal method has proved so eminently satisfactory. The essential feature of the procedure is the removal of the anterior end of the antromeatal wall below the line of attachment of the inferior turbinal, and for a short distance above it.

The nasal wall of the antrum is first pierced beneath the inferior turbinal, and the opening is extended backwards, as far as is deemed necessary, by means of strong backward-cutting forceps (*Fig.* 70). In all cases the extreme anterior portion of the inner antral wall is removed, so that a little finger passed in through the nares glides along the outer wall without interruption to the posterior face of the anterior wall of the antrum. It is very important to remove the lower part of the antromeatal wall by means of strong angular forceps which cut downwards. Finally, if the inferior turbinal projects and narrows the entry to the nasal passage, it is pressed *outwards*, fracturing the turbinate bone near its base. This usually avoids the necessity of removing the anterior third of the turbinal.

Fig. 71.—To illustrate Watson Williams's intranasal operation in the maxillary antrum.

Examination of the Sphenoidal Sinus by the Naso-pharyngoscope.—Walker-Wood[10] claims that the orifice of the sphenoidal sinus can be clearly seen with the aid of the naso-pharyngoscope, without the removal of the middle turbinal. The nose is first prepared by shrinking the mucous membrane with cocaine and adrenalin. The instrument is then passed along the floor of the nasal cavity until the tip reaches the posterior edge of the hard palate, the lens being turned directly upwards. The orifice of the sinus now comes into view between the middle turbinal and the septum. It may be necessary to rotate the instrument a little to the right or left.

Spheno-choanal Polypi.—Kubo[11] reports four cases in which a choanal polypus grew from the interior of the sphenoidal sinus. These polypi may completely obstruct both choanæ, and be mistaken for nasopharyngeal fibromata. Simple removal with the snare is not sufficient, and the sphenoidal sinus itself must be dealt with.

The Fate of Sinuses that have been Operated on.—Moure[12] holds that it is impossible by operation to obliterate the accessory sinuses in many cases ; secondly, that in spite of the existence of so-called ' dead spaces,' patients are completely cured ; thirdly, that the only point of vital importance is the extinction of ethmoidal lesions. Moure has been struck by the fact that when he re-opened frontal and maxillary sinuses which had been operated upon, cavities which had been very roomy at the first operation no longer existed, as they had become filled up with fibrous tissue and the bony walls had come nearer to one another. Moure asks why, if operated sinuses become filled up, it is necessary to perform extensive and disfiguring operations. He believes that all that is needed is an opening large enough to enable us to remove the whole of the lining membrane. He is accustomed to swab out the interior of the sinus with a 10 per cent solution of zinc chloride after the removal of the mucosa. Ssamoylenko has experimented on cats and dogs, and shown that, after the removal of the lining membrane of an accessory sinus, the cavity became completely obliterated by the formation of cicatricial fibrous tissue in about six months. [The abstractor would call attention to the fact that on reopening a mastoid on which the Schwartze operation has been performed some months before, the operation cavity is usually found to be almost obliterated by fibrous tissue and new bone.]

REFERENCES.—[1]*Jour. Laryngol.* 1913, 642 ; [2]*Ibid.* 1914, 225 ; [3]*Ibid.* 242 ; [4]*Zeits. f. Laryngol.* v, Heft 2 ; [5]*Ibid.* v, Heft 3 ; [6]*Lancet*, 1914, i, 306 ; [7]*Ann. Otol.* 1914, Mar. ; [8]*Zeits. f. Laryngol.* vi, Heft 3 ; [9]*Jour. Laryngol.* 1914, 113 ; [10]*Ibid.* 131 ; [11]*Arch. f. Laryngol.* xxviii, Pt. 2 ; [12]*Jour. Laryngol.* 1913, 526.

NAVAL AND MILITARY SURGERY. (*See* Part III.)

NECK, CARCINOMA OF. *K. W. Monsarrat, F.R.C.S.*

Lorenz[1] states that most branchial fistulæ are derived from the second branchial cleft. *Branchiogenic carcinomata* are apt to make their appearance in the form of a small nodule below the jaw. This is generally diagnosed clinically as a swollen lymphatic gland, and an

incision is made. The disease then usually advances rapidly and infiltrates, and secondary glandular deposits make their appearance. Often when the surgeon first sees the case the prognosis is hopeless. Even when seen early, the growth has adhesions to the sternomastoid muscle, the carotid sheath, and branches of the external carotid, which make its dissection difficult. It is a squamous-celled cancer. The diagnosis proceeds chiefly by exclusion. In the absence of any disease in the mouth, one should think of this possible origin of an infiltrating growth in the neck. Primary carcinoma of the submaxillary salivary gland is uncommon, but has to be borne in mind ; morbid changes in an aberrant thyroid should also be thought of. Extensive resection is the only treatment ; the prognosis is bad.

Sinjuschin[2] writes on the *tumours of the carotid body* (*See also* following article). This body possesses an alveolar structure, and a capsule from which septa run into its substance. Between these are large epithelioid cells with large nuclei and chromatin structure. The vessels are numerous, and the cells appear to be related to the endothelium of these vessels. The tumours develop in the carotid triangle, and are firm and nodular ; they are movable laterally, but not up and down ; and pulsate. The operation is difficult owing to adhesions to the carotid or the vagus, and resection of the vagus may be necessary. These tumours may behave as malignant growths ; they can hardly be removed without ligature, at any rate temporary, of the carotid artery. Graham[3] draws attention to the work of Stillings, which goes to show that the carotid body belongs to the sympathetic nervous system. He states that 35 cases had been reported up to 1913, and he relates the histories of 2 additional. In 36 in which histories were available there were 19 men and 17 women. In 22 cases all three carotids were ligatured, in 5 the external carotid alone. In 7 cases the tumour was removed without injury to the vessels. In 6 cases there was injury to the vagus, in 8 to the hypoglossal, in 4 to the sympathetic. Hemiplegia occurred four times. In 4 cases the growth recurred, in 3 after ligature of the carotid with removal of the tumour, and in 1 after removal of the tumour only. Da Costa[4] gives his personal experience with tumours of this kind. He considers that when the carotid body is palpable or visible it is pathological, will probably become malignant, and should be removed at once. Late operations are highly perilous. He reports an early case operated on which remained well fourteen months afterwards ; also the history and post-mortem examination of a case of bilateral tumour of this kind. He holds that the carotid body persists more frequently than has been supposed. It should disappear about puberty ; if not, it will probably enlarge and form a tumour. In the early stages this tumour is clinically simple and is a perithelioma ; after a time it may develop malignant characters. It is closely connected with the vessels and the vagus, and is more retro- than inter-carotid. It is extremely vascular. Operation is comparatively safe when the tumour is small, but perilous

in large growths, as in these ligature of all the carotids will probably be necessary, and injury to important nerves is almost unavoidable.

Morestin[5] writes on the *removal of cervical glands in cancers of the mouth and pharynx*. The strictly local phase of this disease is of short duration. It should be looked upon as a glosso- or labio- or pharyngo-ganglionic disease, and surgically one must associate in the strictest sense the initial tumour and the whole lymphatic area where it arises. When these patients succumb they practically never show distant metastasis; migration takes place exclusively by the lymphatic system, and in the immense majority of cases the cervical glands alone are affected. This is an encouragement to attack these cancers surgically, and to sacrifice everything that can be sacrificed to bar the progress of the disease. Extirpation of glands must be unilateral or bilateral according to circumstances. It must be undertaken systematically as a necessary complement to the removal of the growth itself. Ablation must be done *en bloc*; all the ganglionic chains must be removed, along with their surrounding cellular tissue (*Plate XXXIX*). All the important structures of the carotid and supraclavicular regions are laid bare, and the submaxillary triangle completely emptied. It is desirable to suppress the initial lesion at the same time, particularly in cancers of the tongue and pharynx, but in practice it is sometimes necessary to divide the procedure into two or three stages. In such cases ligature, or better still resection, of the external carotid and its branches is a wise precaution. When the growth and glands are removed at the same time, it is useful to close the carotid region to avoid risk of grave infection, and to suture the sternomastoid to the subhyoid muscles, the posterior belly of the digastric, and the pharyngeal wall (*Plate XL*). This practice improves the prognosis. When glands are adherent, one must not hesitate to remove the sternomastoid muscle, the internal jugular, or even the vagus, provided that it is sacrificed on one side only. Ligature of the common or internal carotid is much more dangerous and not often necessary. Resection of the clavicle may sometimes be of great value in giving access to low glands.

If a good technique is followed, it may be confidently affirmed that the surgical cure of these cancers is not a chimera, but, on the contrary, a result to be expected, provided the patients are operated on early. The incision is triradiate, with its centre at the upper border of the thyroid cartilage. Three flaps are thrown back. Beginning above, the lower border of the jaw is laid bare, the submaxillary gland is separated above, and the parotid separated from the anterior border of the sternomastoid as far as its origin from the mastoid process (*Plate XLI*). In this dissection many veins are cut. The submaxillary triangle is then completely emptied. The superficial cervical fascia is then incised along the posterior border of the sternomastoid and turned forwards along the whole length, together with some glands associated with the external jugular vein. At the inner border of the muscle the carotid region is opened up (*Plate XLII*). Attention is then directed to the spinal accessory nerve, and a mass of glands and

PLATE XXXIX.

MORESTIN'S OPERATION FOR CANCER OF THE MOUTH AND PHARYNX

Removal *en bloc* of growth and glands in cancer of the tongue.

PLATE XL.

MORESTIN'S OPERATION—*continued*

Suture of the muscles after removal *en bloc*.

PLATE XLI.

MORESTIN'S OPERATION—*continued*

First stage of the 'gland operation' when carried out as a separate procedure.

PLATE XLII.

MORESTIN'S OPERATION—*continued*

Second stage of the 'gland operation.' Dissection of the carotid region.

fat behind it. This is dissected, passed under the nerve, and retracted forwards. The posterior triangle is then cleared from below upwards. In this way the whole gland-bearing tissue on the side of the neck is freed in one mass. In adherent cases various structures may have to be sacrificed.

In cancers of the floor of the mouth, Morestin performs an operation in three stages : (*a*) Excision of the glands on one side ; (*b*) Excision of the glands on the other side ; (*c*) Excision of the floor of the mouth, with resection of the mandible, usually at the level of the second molar. In cancer of the tongue the operation is best done in one stage.

References.—[1]*Beitr. z. klin. Chir.* 1913, lxxxv, 599 ; [2]*Med. Rundschen.* 1913, lxxix, 34 ; [3]*Cleveland Med. Jour.* 1913, xii, 537 ; [4]*N. Y. Med. Jour.* 1914, i, 253 ; [5]*Jour. de Chir.* 1913, x, 657.

NECK, TUMOURS OF THE. *F. W. Goyder, F.R.C.S.*

McKenty[1] says that the branchial system of arches and pouches is a frequent source of cysts, fistulæ, and new growths in the neck. Since the two former are apt to give rise to the last, removal is advisable. The diagnosis, particularly of the last form, is very difficult, and often impossible before operation. A thorough examination of the mouth and throat is essential in all neck tumours. A minute growth in these regions may give rise to extensive metastases. A malignant growth of the neck which does not involve skin or mucous membrane, and for which no primary focus can be found, is to be looked on as a branchiogenic cancer. Microscopically, some of these cases are epithelioma, but the majority are probably endothelioma of one or other type. The same is true of the carotid tumours. These are likely to be mistaken for accessory thyroids. The authors regard ' mixed parotid tumours ' as tumours arising from the first or second arch, and not from the parotid gland.

Tumour of Carotid Body (*See also* preceding article). — Callison and McKenty[2] have collected sixty cases of this condition. The clinical history of nearly all the cases is that of a typical endothelioma, i.e. a long period of slow growth without symptoms, followed by a rapid growth and symptoms of local pressure and, in some cases, of dissemination. The results of operation also agree with the behaviour of endothelioma. Early and complete removal usually results in cure. Incomplete removal causes rapid proliferation of the remaining portion, and often dissemination. In some cases the carotid bifurcation had to be removed with the tumour. Diagnosis is difficult, but a single tumour in the carotid triangle, with a long history, may suggest the true cause. Microscopically, most of the cases showed the structure of endothelioma, many, as is so frequently the case, being labelled mixed-celled sarcoma. [The bad results which so frequently follow operations for endothelioma are due chiefly to the fact that it is not sufficiently well recognized that endothelial cells capable of proliferation are found in the capsule of these tumours. Unless this is fully removed with the tumour, recurrence is certain.—F. W. G.]

References.—[1]*Surg. Gyn. and Obst.* 1914, ii, 141 ; [2]*Ann. Surg.* 1913, ii, 740.

NEPHRITIS.

Francis D. Boyd, M.D.
John D. Comrie, M.D.

Granular Kidney.—West[1] points out that when the radial vessel is thickened the two chief changes are atheromatous and renal, and these may be distinguished by age. Yet in the young adult there is a form of thickening which, though not often referred to, is important. Thickening sometimes occurs in athletic young persons which is not degenerative and a sign of disease, but is a physiological hypertrophy and evidence of extremely vigorous life. Violent muscular effort leads to hypertrophy of the muscular coat of the arteries as it does of the heart. It is most marked in the most athletic and healthy, and they would not be capable of such sustained efforts if it did not occur. This physiological hypertrophy disappears in the artery as it does in the heart when the call for it is over, and leaves no trace behind. The arterial tension in granular kidney varies—it ought to be above the normal. It were better that the patient had not granular kidney; but having granular kidney, he ought to have a raised pressure. With a low pressure the patient is not so well, and will not be better till the pressure rises again. There is an average raised pressure for granular kidney which cannot be expressed in figures. The pressure may rise above this or fall below it, and may then require appropriate treatment; but any efforts to reduce the average pressure to the normal for health, will do harm. *Hyperpiesis*—when high pressure occurs without evidence of granular kidney or arterial thickening—is found in individuals who lead a life strenuous alike in work and in play. High pressure is then the normal condition, and cannot be reduced without injury to health. In discussing treatment, the author advocates the use of **Renal Extract,** using a freshly prepared extract from the kidney of the pig. Experience of some years he considers justifies its use, but to be effectual in granular kidney it must be patiently and continuously persevered with for a long time.

Acidosis in Chronic Renal Disease.—Sellards[2] points out that in uræmia a characteristic form of dyspnœa occurs which has not been fully explained. In typical cases there is very deep respiration, with prolonged expiration and an increase in rate. Cyanosis is either absent, or so slight as to be wholly out of proportion to the degree of dyspnœa. Drowsiness and eventually coma develop. This type of dyspnœa is usually described under the term 'renal asthma' or 'air hunger.' If acidosis is present during uræmia, it would explain this dyspnœa satisfactorily, and would have a fundamental bearing upon the question of therapy in renal disease. Observations carried out on a number of nephritics show an increased tolerance to bases in many. The parallelism between this increase in tolerance and the impoverishment of the blood in titratable alkali is crucial evidence of a marked deficit of the body in bases, or substances which readily give rise to bases. This deficit is sufficient to give rise to a definite clinical syndrome. In four cases of uræmia the carbon-dioxide content of the blood was remarkably lowered, and acidosis of a high

grade was present, characterized by (1) An increased tolerance to bases; (2) Decrease in the titratable alkalinity; (3) Decrease in the carbon-dioxide content of the blood; (4) Normal excretion of ammonia; (5) Absence of any disturbance of carbohydrate or fat metabolism.

There are several factors bearing upon the clinical significance of the acidosis. In uræmic cases the severity of the condition of the individual patient was by no means proportionate to the degree of acidosis. In some cases the lack of carbonates was extreme, while in others the deficit was so slight that no symptoms of dyspnœa developed. Acidosis is, in fact, the result and not the cause of the renal disease. It is not a terminal event, but is present in an appreciable degree in ordinary cases of nephritis. There may be definite signs of chronic interstitial lesions without any appreciable grade of acidosis; on the other hand, acidosis with dyspnœa may develop many months before any signs of uræmia appear. Furthermore, acidosis may be so marked as to play an important rôle in the symptomatology of uræmia and even constitute the immediate cause of death. That it is seldom, if ever, the sole cause of death is strongly indicated by the merely transient benefit followed by the injection of bicarbonate in the uræmia of chronic cases. Some of the symptoms resembling toxæmia in uræmia are due, not altogether to the presence of a foreign toxin, but in fact to the depletion of the body in one of its normal constituents. Therefore, the therapeutic bleeding for the removal of any toxins that may be circulating in the blood causes at the same time a further diminution of a substance which is already seriously depleted. This disadvantage could be obviated by the injection of bicarbonate, though special precautions might be necessary in the many cases where the bleeding is done primarily for relief of some mechanical embarrassment of the circulation. In the treatment of acidosis by bicarbonates, diuresis followed administration as a rule. Even in advanced uræmia the fluid balance was not disturbed or polyuria resulted. There was thus no increase in œdema from 'salt action.' In treatment, the bicarbonate rather than the normal carbonate should be used, for concentrations of 4 to 5 per cent can be employed without producing hæmolyses. Stronger solutions of bicarbonate can therefore be used, and the effects are longer maintained than with the carbonate. (*See also* HEART, DISEASES OF.)

Nitrogen of the Blood in Nephritis.—The extreme importance of the proportion of urea in the blood-serum in nephritis has been demonstrated by Widal[3] and his collaborators. The technique of the observation is comparatively simple, and enables the observer to differentiate the symptoms due to nitrogen retention from those of chloride retention and arterial hypertension. The estimation of urea is in addition of the greatest importance in relation to prognosis, at times a very difficult question for the clinician. The authors contend that an observer is not justified in taking the responsibility of advising a sufferer from chronic nephritis unless the presence or

absence of nitrogen retention is known. The quantity of urea in the blood is of more importance than the amount of albumin in the urine. A transitory increase is found in certain infections and intoxications, but is not necessarily of fatal prognosis. In nephritis, all published observations establish the rules laid down by Jarval. When the quantity of urea in the blood fluctuates between 1 and 2 grams per litre, the probability of life seldom exceeds one year. The course of the disease is more rapid when the urea oscillates between 2 and 3 grams ; it is then a question of months, generally weeks. When the figure exceeds 3 grams the time of survival is very short. Even larger amounts are sometimes seen, ranging between 4 and 5 grams, and even as high as 8 in two cases. When the figure for urea in the blood fluctuates between 0·5 and 1 gram, one should be careful in giving a prognosis from a single observation ; it is necessary to renew the observation at intervals, to estimate the development of the disease. There are three possibilities—amounts of urea which exceed 0·5 gram per litre may fall gradually to the normal, or may be maintained at this figure for months or even years, or may rise to 1 gram and above. Prognosis based on a single observation may lead to error. Thus, a patient who had suffered from nephritis for five years gave, on final estimation of urea a figure of 0·75 ; after repose and diet this fell to ·57, ·53, and at the end of two and a half months marked 0·49, and thereafter was maintained constantly at the normal. On the other hand, a patient may show remarkably progressive nitrogen retention up to the fatal issue.

Three years ago Ambard gave us calculations which showed it was possible to correlate the urea of the blood and urine, and to establish for each individual a co-efficient which would show the activity of the renal secretion by the relation of the blood and urine. This co-efficient is remarkably constant in the normal individual. Observations show that in nephritis the ratio is not so constant as in health. This is the case when the urea concentration in the blood is little more than 0·5. When the quantity passes 1 gram, all are agreed that it is the concentration of urea in the blood which rules the prognosis—urinary estimations are of little importance. In nephritis with chloride retention the same holds good. It was found that in three patients there was remarkable constancy between the quantity of urea in the blood and the quantity of albuminoids in the diet. In 72 cases of nephritis, the authors only found a normal urea quantity in 17. In 55 the figures were constantly between 0·09 and 0·16. Thus 76 per cent presented a slight increase, and amongst these patients were examples of pure hypertension and of simple albuminuria leading their normal life. This increase may be observed when the nephritic phenomena are little marked. In all nephritis, azoturia might be noted supervening as a terminal phenomenon. Have we, in an increase in the ratio of Ambard, preceded by an increase in the urea of the blood, a guide permitting us to foresee this evolution ? This must be answered in the negative. Observations, moreover, show

that the position of the patient at the time of examination can lead to important differences in the ratio of Ambard, but the urea of the blood remained constant. Ambard's ratio is a very delicate test of urinary secretion, but is not of the same value in estimation of the prognosis.

Clinically, when the urea in the serum does not exceed 0·5 per litre, we need not fear azoturia. When urea is raised between 0·5 and 1 gram, one must compare the quantities on several occasions. When urea exceeds 1 gram, prognosis should be guarded. When, in a chronic subject, the serum contains 2 grams of urea per litre, the prognosis is extremely grave.

REFERENCES.—[1]*Lancet*, 1913, ii, 1813; [2]*Johns Hop. Hosp. Bull.* 1914, 141; [3]*Presse Méd.* 1914, 409

NEURALGIA, TRIGEMINAL.

(*Vol.* 1914, *p.* 377)—At this reference the technique of Alcohol Injection into the Gasserian ganglion is fully described.

NEURASTHENIA.

Uses of **Cerebral Electrization** in treatment (*p.* 72).

NEUROSES IN CHILDREN. *Frederick Langmead, M.D., F.R.C.P.*

With the revival of interest in psychology, the nervous states incidental to childhood are being more carefully studied. J. P. Crozer Griffith,[1] writing of neuropathic or nervous children, agrees with the opinion generally held that the condition is nearly always inherited, one or both parents showing nervous manifestations. The neurotic taint may not be obvious, but it causes symptoms to arise under exciting influences which would produce no effect in normal children. Among the factors which contribute to the development of symptoms in nervous children he mentions the incomplete physiological acquirement of cortical control, the strong power of imitation, faults in training and surroundings, over-play and over-work, association with nervous parents, and such influences as fright, shock, trauma, and weakening diseases. After drawing a clinical picture of the nervous child, with whose symptoms we are familiar in this country from the writings of Guthrie, Still, and others, he states his conviction that vomiting in infants is in many cases a nervous habit.

Psychasthenia on the one hand only differs from simple nervousness in the predominance of the psychical element, and on the other hand approaches closely in some cases to insanity and in others to hysteria. The symptoms usually appear soon after puberty. One of the most important is a state of doubt, with which are associated phobias of all sorts and over-conscientiousness, obsessions and imperative ideas. This morbid condition induces lack of will-power and concentration, restlessness, repetition of acts, melancholic states from the consciousness of personal imperfection, hallucinations, fear of objects, places, and conditions, the fear of personal contamination, impulses to spring into water or from a high window, etc. Among psychasthenic disorders the author also places some instances of sudden violent

attacks of rage in little children. In more advanced cases the obsessions may lead to criminal acts, self-mutilation, or suicide. Truancy from school, running away from home, and sexual perversion are sometimes evidences of psychasthenia. The condition differs from insanity in that the child recognizes that the ideas and acts are wrong; he feels only an inability to control them.

The very occurrence of *hysteria* in children is denied by some writers, whilst others hold that it is fairly common. Griffith believes in its existence, but regards it as rare. He describes it as a neurosis in which there is great emotional excitability; an exalted egotism; a desire to attract attention; defective will-power; and imperative and perverted ideas often produced by suggestion and auto-suggestion. As a result there is a great variety of symptoms apparently of corporeal affections, but in reality simulative and psychical in origin. In early life usually one symptom only is manifest, and the so-called hysterical stigmata are often absent.

Treatment.—In the treatment of these conditions, Griffith lays stress upon the importance of prevention. Caution should be exercised against excitement and mental over-stimulation. Abundant undisturbed sleep is of the highest value. Exciting and fearsome stories should be banned. Scholastic teaching should be regarded as secondary to maintaining a healthy condition of mind and body; study hours are far too long for many children. Constant association of the child with nervous parents should be avoided, for nothing is better for a 'peculiar' child than mingling with playmates of its own age. The basis of all treatment, when this condition is present, is to make the child *forget*, the general health being attended to and all visible causes being removed. No anxiety must be shown about the manifestations, nor remark made regarding them in the hearing of the child. Separation from anxious parents is almost a necessity in severe cases. The nurse and doctor must be kind but firm, and must show an apparent indifference to the symptoms. Encouragement of every kind must be given, and suggestion may be employed in the form of insisting that the patient is better. Suggestion may be aided by the employment of mechanical or other devices, but it is wise to avoid treating locally the region which is affected. Occasionally shock or surprise, as by sudden command, the use of a douche of cold water, or electricity, may cause a hysterical symptom to cease; but the gradual diversion of the child's mind from its symptoms, by a systematic ignoring of them, generally offers the best hope of cure. Treatment by drugs is of minor importance; they are only required to treat the general health and relieve certain urgent symptoms.

W. H. Howell[2] also writes on the value of **Suggestion** treatment in diseases of childhood. The hypnotic method he regards as unnecessary, and not free from danger. For many cases he recommends the cathartic method, which consists in removing from the child's life the influence or irritant giving rise to his psychical disturbance, which in turn has undermined his health. The suggestion or deviation

method is applicable, in his opinion, to patients when it is impossible to analyze the case or remove the cause; or where the cause has ceased to be active, but the remembrance of it produces the ill effect. The treatment appears to consist in asserting in the child's presence that it will get well, and in administering some unpleasant medicine or mechanical treatment. These methods, he thinks, may also play a useful part in the treatment of infective and organic disease.

REFERENCES.—[1]*N.Y. Med. Jour.* 1914, i, 1113; [2]*Boston Med. and Surg. Jour.* 1914, i, 230.

NICOTINISM. (*See* TOBACCO POISONING.)

NOSE, DISEASES OF. *J. S. Fraser, M.B., F.R.C.S.*

Local Anæsthesia in Nasal Operations.—Joachim[1] strongly recommends that operations on the nasal passages should be performed under local anæsthesia. The best drugs for this purpose are alypin and novocain combined with adrenalin. Novocain possesses only one-tenth, and alypin only one-fourth, the toxicity of cocaine. Solutions of the two former drugs may be sterilized by boiling, without destruction of their properties. The solutions recommended are: (1) 20 per cent solution of alypin, to which is added one-fifth of its volume of adrenalin solution; (2) Four drachms of 2 per cent novocain solution, to which are added fifteen drops of adrenalin. The former solution is used for surface anæsthesia, and the latter for injection. Whenever possible, the injection should be made into and around the nerve trunk supplying the part, and it is necessary to wait for at least eight minutes before commencing to operate.

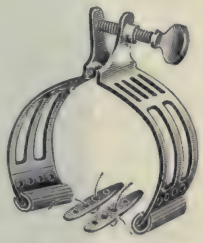


Fig. 72.—Carter's bridge splint for correction of nasal deformities.

Correction of External Nasal Deformities.—Carter[2] divides nasal deformities into: (1) Those without loss of tissue; (2) Those with more or less destruction of the bony and cartilaginous framework of the nose. The first group of cases are amenable to the bridge-splint operation devised by the author. The splint consists of a lightly constructed steel bridge, the two wings of which are hinged together in the middle (*Fig.* 72). The distance to which the wings can be separated is regulated by a thumb-screw. The edges of the wings are padded with rubber. There are, further, two small intranasal splints, perforated by several small holes. Before using the splint it is necessary to mobilize thoroughly the framework of the nose. Thereafter silk sutures are passed through holes in the intranasal splints, and, by means of curved needles, each suture is then passed from within the nose through the roof of the cavity, near the junction of the bone and cartilage. The bridge is then placed over the nose, and the sutures are passed through holes on the bridge and tied together over the hinge. The bridge may be anchored to the forehead by means of an adhesive strap. In many cases it is necessary to resect the septum

before attempting to correct the external deformity. It is advisable to guard against the use of too much force in applying the splint, and the skin under the rubber pads should be bathed daily with alcohol.

In cases associated with loss of bone or cartilage, the transplantation of bone is indicated. (*See* MEDICAL ANNUAL, 1914, p. 381, for illustration of the method.) Such cases may be due to atrophic rhinitis, traumatism followed by infection, and syphilis. Strict asepsis

Fig. 73.—Carter's operation for correction of nasal deformity. Showing correct position for transplanted bone. (*Illustration kindly lent by "Medical Record."*)

is necessary in dealing with these cases. A curved incision with the convexity downwards is made between the eyebrows. This incision extends down to the periosteum over the frontal bone. The flap is dissected up, and the periosteum over the glabellum is elevated for about three-eighths of an inch. With the sharp elevator, the skin and submucous tissue are then elevated over the dorsum and sides of the nose. Having thus prepared the bed, Carter proceeds to remove

about 2 in. of the ninth rib, preserving the periosteum on the outer surface. This piece of rib is then split in its transverse diameter, and the outer half is shaped to suit the deformity. The cancellous tissue of the rib is scraped away, leaving only a thin layer of compact bone. Without removing the blood which has accumulated in the nasal wound, the bone-graft is inserted nearly to the tip of the nose and the upper end is carefully placed beneath the periosteum over the frontal bone (*Fig.* 73). The semilunar flap is then brought down into place, the wound closed with horsehair sutures, and a collodion and gauze dressing applied. Healing is usually complete in ten days.

Marshall[3] operates by external incision, made directly over the nasal process of the superior maxilla, at the point where the nasal process begins. The incision runs parallel to the normal line of the nose. The nasal process is cut through at this point with a bevelled chisel. The opposite side is treated in a like manner. By means of a broad-bladed forceps, one blade of which lies in the nose and the other outside, the operator completes the fracture of the nasal process and so mobilizes it. If necessary, the nasal septum is forced into correct position with the same forceps. If the nose is not yet in a straight line, the defect lies at the junction between the frontal and nasal bones. This can be rectified by a sharp stroke with the mallet. The incisions are finally covered by gauze and collodion. In some cases nasal splints are inserted for twenty-four hours.

Colds in the Head.—Leonard Hill and Muecke[4] have carried out an investigation into the effect of warm confined atmospheres on the mucous membrane of the nose and throat. The mucosa becomes turgid with blood and infiltrated with lymph, and covered with thick secretion. The respiratory passages are thus narrowed. On passing into a cold atmosphere the mucous membrane becomes pale, but remains swollen with lymph. The authors believe that 'colds' are due to the inhalation of large quantities of bacteria in warm confined atmospheres, followed by exposure to cold moist outer air. The danger of infection in the close atmosphere is diminished by keeping the air in motion. The authors also find that convection heat flushes and swells the nasal mucous membrane, whilst radiant heat causes sweating of the skin and does not affect the nose.

Logan Turner and Hay Bolton[5] record the results in 50 cases of *rhinitis*, in all of which **Autogenous Vaccines** were used. As a rule, injection was given once a week and the treatment continued for six or eight weeks. The initial dose was small, but was doubled on the second occasion, and so on. Seven cases suffering from recurrent attacks of coryza yielded a staphylococcus or the pneumococcus, and reacted favourably to vaccine therapy. In 4, however, a second course had to be employed, and the authors remark that it is probable that such cases may require an occasional course of vaccine treatment. Eleven cases of chronic mucopurulent nasal catarrh, with enlargement of the inferior turbinals, showed staphylococci, pneumococci, and streptococci, on culture. The results of vaccine

therapy in these cases were uniformly good, and in 4, in which there was a secondary sycosis upon the upper lip, this also disappeared. Of 9 cases of purulent rhinitis with slight crusting and atrophy, 3 showed no improvement following the injections, 1 showed distinct improvement, and 5 were cured. The organisms present in all these cases have already been mentioned. Of 18 cases of fœtid atrophic rhinitis, 8 received no benefit from vaccine therapy, while in the 10 others more or less distinct improvement followed. In all cases, nasal douching had previously been carried out. In 6 of the 10 cases with improvement, a pure culture of Abel's bacillus was obtained, and in the others it was associated with the Streptococcus pyogenes, diphtheroid bacilli (2), pneumococcus, and Staphylococcus aureus. The dose of Abel's bacillus varies from 50 to 500 million bacilli. These results are recorded at various intervals after the cessation of treatment, the longest period being eight months, at which time 1 case had no discharge, odour, or headache. Five cases of accessory-sinus suppuration were treated, but the results appear to have been disappointing.

Harmer[6] finds that some people are very sensitive to vaccines, and that general and local reactions are more frequent than is commonly supposed. Large doses of sensitized vaccines may, however, be given, and good results are obtained in cases of acute streptococcal infection. Pneumococcal cases are disappointing. Colds, pharyngitis, and laryngitis are usually due to mixed infection — *pneumococcus* with *M. catarrhalis* or *B. influenzæ*. In 14 cases of this latter variety, improvement was obtained in 8; and in 15 cases of the former variety of mixed infection, improvement occurred in 11. In chronic sinusitis, streptococcus and Friedländer vaccines gave good results. The results obtained from the administration of immunizing vaccines before operation have been satisfactory.

Ozæna.—Brown Kelly[7] states that a fresh impetus has been given to the collective investigation on ozæna by the bringing to light of the all but forgotten researches of Perez, to which important significance is now attached. In 1899 Fernando Perez, of Buenos Ayres, described a small, polymorphous, Gram-negative, immobile rod as the exciting cause of ozæna, and termed it '*Cocco-bacillus fœtidus ozænæ*.' The University of Vienna completely confirmed Perez' observations. Perez recognizes ozæna as a family disease, and states that a mother with ozæna may have one or more children similarly affected. He regards the disease as infectious. All cultures of the cocco-bacillus give rise to a specific, characteristic odour, which is exactly similar to that of the disease. Injections of a bouillon culture into the marginal vein of the ear of a rabbit caused death in twenty-four hours. Post mortem, the outstanding change was marked inflammation of the mucous membrane of the turbinates. Bacteriological examination revealed the presence of the injected organism. Hofer produced somewhat less intense changes by injecting the toxins from Perez' microbe. If the animal survived, it became infected by a chronic nasal disease characterized by a constant discharge, in which the

inoculated organism was again found. If the animal was killed after some months, atrophy of the anterior turbinate could be demonstrated.

By clinical investigation, Perez found 93 cases in which the disease had been transmitted from one member of a family to one or several other members, and 35 in which it had been contracted by coming in contact with subjects of ozæna who were not members of the same family. It may be transmitted to man also by the dog, as has been proved bacteriologically and clinically by Perez. The cocco-bacillus of ozæna occurs normally in the dog's nose, and increases in those suffering from distemper. Perez has not found it in the nasal cavities of other domestic animals.

Hofer[8] found considerable difficulty in isolating Perez' organism, until he adopted the expedient of injecting into the vein of the rabbit's ear a mixed bouillon culture, in which the fœtor-producing organism was present. In a few days the animal had a profuse purulent nasal discharge, from which a pure culture of the *Cocco-bacillus fœtidus ozænæ* was obtained. In a small fraction of the cases examined, distinct agglutination was obtained, demonstrating the specific nature of the process.

Hofer and Kofler[9] have tried a **Vaccine** of the *Cocco-bacillus fœtidus* in ozæna cases. They injected subcutaneously doses of 10 to 500 million organisms weekly. In all cases local reaction was evidenced by pain at the place of puncture, with slight redness and infiltration. Nasal reaction was evidenced by acute cold in the head, epistaxis, redness of nostrils, tendency to sneeze, and temporary aggravation of the fœtor. Headache, pain over the frontal processes, conjunctivitis, sore throat, etc., were also noted. Sooner or later in the course of the treatment, in almost all cases a surprising diminution, or even complete cessation, of the fœtor was observed. Crust-formation was also less marked, and in some cases the patient was able to discontinue douching the nose. Dry pharyngitis and laryngitis disappeared, but time alone will show whether the improvement amounts to cure.

Kelly and Smith[10] have used a **Vaccine** of Perez' bacillus in the treatment of ozæna, and believe that it exercises a specific action on the nasal affection in diminishing or removing the fœtor, liquefying the secretion, and lessening or checking the crust-formation. Some cases have, however, relapsed.

Mahu[11] follows Smith and Connell in using **Cold Paraffin** below the fusion point for submucous injection. Foy has demonstrated that there is a deficiency of the air current in ozæna, and that strong currents of compressed air passed through the nasal cavities cause the mucosa to regain its moisture in spite of the roomy character of the nose. Mahu considers these two methods of treatment to be complemental: treatment by **Air Current** should precede the injection of paraffin. If these methods fail, he advises lavage, followed by insufflation of powdered **Lactic Acid Ferment.**

Harry[12] gives the following indications for treatment in ozæna: The decomposing crusts must be removed and their reformation

prevented; degenerative changes in the mucosa must be stopped; the turbinal atrophy must be corrected. He advises the following solutions for the nasal douche: normal saline, with 1 dr. each of **Sodium Bicarbonate** and **Sodium Biborate** to the pint, combined with either **Hydrogen Peroxide, Sanitas, Creosote,** or **Oil of Eucalyptus** 2 dr. to each pint. Some time ago one of Harry's ozæna patients volunteered the statement that whenever he stopped taking sugar his condition became worse. Sugar prevents the formation of decomposing products, excites a watery secretion, and inhibits the excretion of fibrin. The method of treatment is as follows: After removal of the crusts, the mucous membrane should be massaged with a cotton-tipped probe, in order to produce congestion. The nostrils are then packed with ribbon gauze soaked in simple syrup. The packing is removed in twelve hours, and the treatment is repeated on alternate days. At the end of a fortnight, insufflation with **Powdered Sugar** is commenced, and this can be carried out by the patient himself.

Employment of **Zinc Ionization** (*p.* 73).

Lupus of the Nasal Cavities.—Albanus[13] has examined 147 cases of lupus of the skin, and found the nasal mucous membrane involved in 46 per cent (15 per cent of those with lupus of the extremities, 56 per cent of the head cases, and 87 per cent of those with lupus of the outer surface of the nose). Albanus points out the much greater frequency with which the septum and inferior turbinal are affected than other areas of the nasal cavity, and draws the conclusion that a considerable proportion of intranasal lupus is due to infection reaching the nose by contact or by the air-stream. Recent observations have shown that tubercle bacilli are circulating in the blood of many children in the complete absence of all symptoms, and cases with numerous discrete foci of lupus on the skin and mucous membranes are certainly due to embolism resulting from this condition of bacillæmia. Aerogenous and contact infections are much favoured by the presence of eczema of the nasal vestibule, or rhinitis sicca. Spread of lupus by way of the lymphatics may take place either in the direction of the lymph-stream or against it.

Nasal Operation in the Treatment of Visual Disturbance.—Baumgarten[14] records 17 cases, of which 14 were completely, or almost completely cured, 2 were markedly improved, and 1 somewhat improved. Five were classed as retrobulbar neuritis, 2 as amblyopia with normal fundus, 3 as papillitis acuta, 2 as papillitis chronica; in 3 cases neuritis acuta was found, and decoloratio papillæ in 2. The colour scotoma disappeared in all cases immediately after the first operation, and was always the first sign of improvement. The following intranasal conditions may be present: (1) Accessory sinus disease; (2) Large ethmoidal bulla, or marked swelling of the middle turbinal; (3) The middle turbinal is in contact with the septum. Even in this latter condition, when the oculist is positive as to the nasal origin of the trouble, operative measures are indicated. In all cases the author removes enough of the middle turbinal to expose the anterior wall of

the sphenoidal sinus, which can then be opened if necessary on the following day.

Adenocarcinoma.—This is defined by Alexander[15] as an adenoma which has undergone carcinomatous development and shows proliferation of the glandular cells with areas of confusion, resulting in penetration of the basement membrane. Of nearly 200 cases of intranasal cancer hitherto reported, only 21 are adenocarcinoma. Many of these cases were originally diagnosed as 'nasal polypus.' Alexander's case was that of a patient, age 55, who had had profuse blood-stained nasal discharge for a year. Polypi had been removed on many occasions, accompanied by profuse hæmorrhage. There was no pain, but the patient had lost 40 lb. in twelve months. The right nostril was occluded by a pale lobulated growth which bled easily. The right choana was also occluded, and the accessory sinuses on the right side did not illuminate. At the operation the right external carotid was ligatured. An extended Killian incision was made, and the frontal sinus was found to be free from growth, which, however, entirely occupied the ethmoidal region. The maxillary antrum was also found to be filled with new growth. The patient was discharged from hospital on the eighth day. There is no authoritative case on record where recurrence has not taken place. Alexander believes that routine examination of polypoid growths would lead to the early recognition of those showing a malignant tendency.

Hay Fever.—Dunbar [16] holds that in every case a clear-cut diagnosis should be made to avoid unsatisfactory results. This should be done by means of a toxin reaction. A hay fever patient reacts to 1 drop of a 1–200,000 solution of pollen albumin placed on a mucous surface.

Ulrich[17] refers to Dunbar's serum, which is on the market under the name of **Pollantin.** Ulrich holds that the results of this serum have not come up to expectations. Noon and Freeman, on the other hand, have tried to produce active immunity by injecting patients with small quantities of pollen extract, judging the dosage entirely by the conjunctival reaction. They claim to increase the resistance of the patient at least ten times, but Clowes has shown that this increase is not maintained even for five months. Weichert, Wolff-Eisner, and Auer believe that hay fever is possibly a hypersensibility to a foreign protein, and that its manifestations are of an anaphylactic nature. It is supposed that pollen toxin is absorbed into the blood, and that its products exert a selective action on certain nerve-cell groups, producing engorgement of the nasal mucosa, asthma, and general excitation. Ulrich believes that the clinical picture of hay fever does not correspond to that of any known infectious process, but can be explained by an irregular protein intoxication, the portal of entry of which is the nose. He holds that the pollen of ragweed is the cause of autumnal catarrh. He has injected extracts (0·5 c.c. of a dilution 1–1,000,000), and claims satisfactory results in eight out of twelve cases.

References.—[1]*New Orleans Med. and Surg. Jour.* 1912, Oct.; [2]*Med.*

Rec. 1914, i, 237 ; [3]*Jour. Amer. Med. Assoc.* 1913, Jan. 18 ; [4]*Lancet*, 1913, May 10 ; [5]*Med. Press and Circ.* 1913, ii, 583 ; [6]*Proc. Roy. Soc. Med.*, Sect. Med. 1914, Mar. ; [7]*Jour. Laryngol.* 1914, 255 ; [8]*Berl. klin. Woch.* 1913, No. 52 ; [9]*Wien. klin. Woch.* 1913, No. 42 ; [10]*Jour. Laryngol.* 1914, 471 ; [11]*Presse Méd.* 1913, Jan. 4 ; [12]*Prescriber*, 1914, 15 ; [13]*Arch. f. Laryngol.* xxvii, Pt. 2 ; [14]*Ibid.* xxv, Pt. 1 ; [15]*Ann. Otol.* 1914, Mar. ; [16]*Ibid.* xxi, 279 ; [17]*Jour. Amer. Med. Assoc.* 1914, i, 1220.

NOSE AND THROAT, INOPERABLE GROWTHS OF.

J. S. Fraser, M.B., F.R.C.S.

Harmer[1] considers that **Diathermy** has not received as much attention as it deserves. A suitable instrument can be obtained for £25, to produce a high-frequency current of great power. Two electrodes are used ; the larger, which is wrapped in wet towels, is laid on the patient's chest, while the smaller one is applied to the growth. The passage of the current through the small electrode produces intense heat, which rapidly destroys the tissues. Very little heat is produced in the region of the larger electrode. It is essential to have the assistance of a physician, who is responsible for the current. To avoid shocks, the surgeon must wear rubber gloves, and, to avoid sparking, the small electrode must be buried in the growth before the current is turned on, and must not be moved until the current is disconnected. The strictest aseptic precautions are necessary. A preliminary dose of atropine is given, followed by a general anæsthetic in the case of large growths. The part to be attacked must be quite dry, and frequent sponging is necessary. The best electrode for large growths is a rake with five to ten points, $\frac{1}{2}$ in. long, which are buried deeply in the tumour. When the current is turned on, the neighbouring tissues are rapidly blanched. A series of punctures should be made, so as to attack every part of the growth. Harmer removes with spoon or forceps the tissues which have been cauterized, and then repeats the burning, so that the deeper parts of the growth are attacked, leaving only tissues which are soft and freely movable. Even a tongue which is bound down by cancer of the tonsil may be completely freed by this treatment. During and after the operation it is necessary to be prepared for immediate tracheotomy. It is advisable to avoid burning the tumour too rapidly, to obviate dangerous swelling of the neck. The sloughs which form must not be torn away too roughly, for fear of troublesome hæmorrhage. Harmer treated twenty-one patients suffering from inoperable growths, e.g., cancers of the tonsil, tongue, palate, or pharynx, and Rose dealt successfully with a naso-pharyngeal fibroma. The pain caused by the burning in these cases was not severe, and, as a rule, the patients could swallow easily after forty-eight hours. Œdema as a result of the operation was rare, and there were only two cases of marked swelling of the neck. Two patients died of septic pneumonia. Shock was not produced, the patients usually getting up within forty-eight hours. Sloughs separated in five to ten days, leaving a healthy wound covered with normal mucous membrane, and without tendency to scar. Harmer notes that the operation resulted in cessation of septic

discharge and salivation, and that hæmorrhage and dysphagia were greatly relieved. Unfavourable cases were those in which the growth had invaded the neck, or where bone was diseased. In only one case was there a secondary hæmorrhage, but in two instances there was some burning in the region of the large electrode. In most instances more than one treatment was found to be necessary, one old man with cancer of the tonsil and tongue receiving five applications and living for two years with little discomfort. Harmer claims that diathermy has obvious advantages over the knife as regards rapidity and ease of operation, absence of bleeding, sealing of the lymphatics by the cautery, and rapidity of recovery. For simple vascular tumours, such as *nævi*, the results are all that could be desired.

Hill[2] believes that **Radium** is worth trying in any malignant growth in the nose and throat which is outside the range of radical excision by the knife, provided that the growth is accessible, an adequate amount of radium available, and the general health fairly good. It must be remembered that, when an extensive growth is irradiated, a massive dose of toxins enters the circulation and may cause a very definite toxæmia, associated, in some cases, with dangerous thrombosis in areas remote from the tumour. In pharyngo-laryngeal cancers of large size, marked glandular involvement is a contra-indication. If, in a case of cancer of the gullet, a tracheo-bronchoscopic examination shows that the growth has invaded the air-passages, radium should not be used. Round-celled sarcomata, especially lymphosarcomata and lymphadenomata, and endotheliomata, react rapidly and well to radium. Spindle-celled sarcomata react fairly, but epitheliomata and glandular carcinomas are far more uncertain. Finzi lays down that at least an equivalent of 50 mgrams of radium bromide, i.e., about 26 mgrams in terms of the metal, should be employed. With from 100 to 200 mgrams, suitably screened, the time of application is proportionately decreased, to the great advantage of the patient. Hill considers that it is not necessary to use emanation tubes even in the gullet, as the ordinary radium tubes can be linked up together in tandem fashion. For the last four years Hill has used only platinum screens to cut off all the α rays and most of the β rays. The platinum screens are covered by rubber, to avoid secondary radiation from the metal. For small epitheliomata of the tongue, Pinch employs short needle-like applicators, as these growths respond badly to surface radiation. In the treatment of cancer of the pharynx and œsophagus, it is very advisable to moor the apparatus securely either by a cord or by a flexible silver style. Hill admits that embedding of the radium tube may be necessary in some cases, but points out the danger of sepsis under these circumstances. (If possible, it is better when embedding a tube to make the incision through healthy skin than through mucous membrane.) Hill has had two remarkably good results in cases of epithelioma of the

post-cricoidal region, and in two others substantial temporary improvement. In four other cases there was no obvious benefit. Out of twenty-one cases of malignant growths in the œsophagus, three showed temporary disappearance after radium therapy. One patient, suffering from endothelioma of the thoracic œsophagus, has had nine applications of radium salt during the last four and a half years. At the present time the lesion looks just like an ordinary fibrous stricture. In a second series of twenty cases, the results have been as striking as in the first. With regard to epithelioma of the fauces and pharyngo-larynx, Hill agrees with Harmer and Lack that diathermy has a much wider field of application than radium.

Adam[3] records a case of malignant disease of the hypopharynx, apparently cured by radium. The case has, however, only been observed for a period of two months ; but at the time of writing no trace of growth could be seen, the symptoms had disappeared, and the patient could swallow with comfort for the first time in five years. She had put on ten pounds in weight. Logan Turner has reported a case which had been treated with radium. At first the condition had improved, but later had gone from bad to worse.

References.—[1]*Jour. Laryngol.* 1914, 481 ; [2]*Ibid.* 487 ; [3]*Ibid.* 474.

NYSTAGMUS, MINERS'. (*See* Eye Muscles, Affections of.)

(*Vol.* 1913, *p.* 350)—Cessation from pit work is essential, but above ground is permissible. General health must be attended to, and alcoholic intemperance is especially to be guarded against.

OBESITY.

Bergonié's **Faradic** treatment outlined (*p.* 71).

ŒSOPHAGUS, CARCINOMA OF. (*See also* Œsophagus, Diseases of.)

K. W. Monsarrat, F.R.C.S.

Torek[1] describes the first successful case of resection of the thoracic portion of the œsophagus for carcinoma. He refers to Sauerbruch's statement that only growths in the cervical part of the œsophagus or at the cardia should be operated on, and remarks that this excludes the majority of growths and would confine the operation to those in which metastases are usually early. Among the dangers of operation on the thoracic part are injury to the vagi and leakage from the oral stump. His patient was a woman, age 67. The growth was situated just below the level of the aortic arch, and involved 1½ in. of the canal. Gastrostomy had been performed previously. An incision was made through the whole length of the costal space, and from the posterior end of this another was carried upwards, dividing the fourth to seventh ribs near their tubercles (*Plate XLIII, Fig. A*). Anæsthesia was by tracheal insufflation. The œsophagus was first separated below the tumour and the vagi drawn aside ; over the tumour itself this was more difficult. The separation behind the aortic arch was also difficult, and necessitated the division of some of the thoracic

PLATE XLIII.

TOREK'S OPERATION FOR CARCINOMA OF THE ŒSOPHAGUS

Fig. A.—Incision for resection of œsophagus.

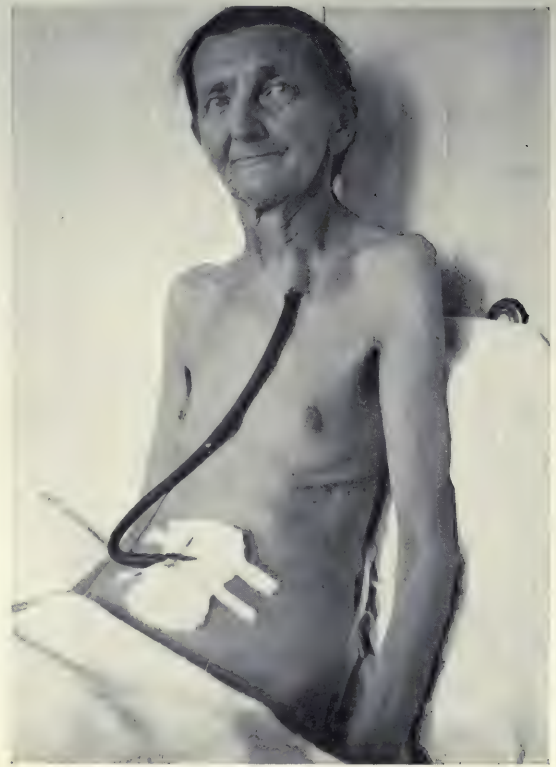


Fig. B.—Method of feeding.

Illustrations kindly lent by "Surgery, Gynæcology, and Obstetrics"

branches. It was continued up to the neck. The canal was cut below the tumour, and the lower end was invaginated. An incision was then made in the neck, and the upper segment, including the cancer, was delivered through this. After removal of the growth, the œsophagus was placed under the skin of the chest and the cut end sutured at an incision made for the purpose. The patient made a good recovery. Feeding was carried out by introducing the gastrostomy tube into the œsophageal opening, the food passing through the tube into the stomach (*Plate XLIII, Fig. B*).

Meyer[2] argues that cancer of the œsophagus is an operative condition which should be passed over to the surgeon absolutely as soon a the diagnosis is made. He emphasizes the comparative benignancy of this form of cancer, so that in a really early successful case the prognosis should be good. Up to the present no surgeon has had a chance to operate on a case under favourable circumstances. He discusses recent methods of œsophagoplasty, especially Jianu's operation, which utilizes part of the greater curvature of the stomach to form a new tube of entrance to the stomach. The opening of this tube should be placed subcutaneously. The upper stump of an œsophagus which has been resected for cancer should always be brought out of the thorax. If there is sufficient length it may be sutured to the Jianu tube; if not, a plastic skin operation may unite the two. He dwells on the necessity for the early investigation of all cases which present difficulty of deglutition. Meyer concludes that, theoretically, intrathoracic œsophagoplasty is the ideal operation. If further operations in man, however, should prove that the transposed oral stump of the œsophagus, no matter how long, has no tendency to become necrosed in its distal portion, but will live as a rule, then further experimental work on the intrathoracic operation will be less urgent, and extrathoracic œsophagoplasty will become the operation of choice for resection of carcinoma in any part of the œsophagus.

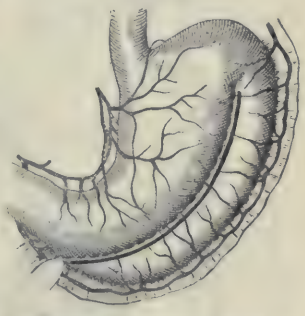


Fig. 74.—Shows lines of incision of stomach and suture. (*Janeway.*)

Janeway[3] describes a new method of making a permanent fistulous gastrostomy in cases of inoperable cancer of the œsophagus. He makes an incision parallel to the course of the rectus fibres a short distance to the left of the middle line and 3 or 4 cms. below the costal margin. The rectus fibres are separated, the peritoneal cavity is opened, the stomach is pulled through, and an incision about 4 cgrams long is made, supplemented by an incision of 1 cgram at the distal end and at right angles to the direction of the first (*Fig.* 74); a tubular projection of the stomach wall is formed (*Fig.* 75), which is brought through between the rectus fibres and

sutured to the skin (*Fig.* 76). This forms a permanent fistulous track which will not leak.

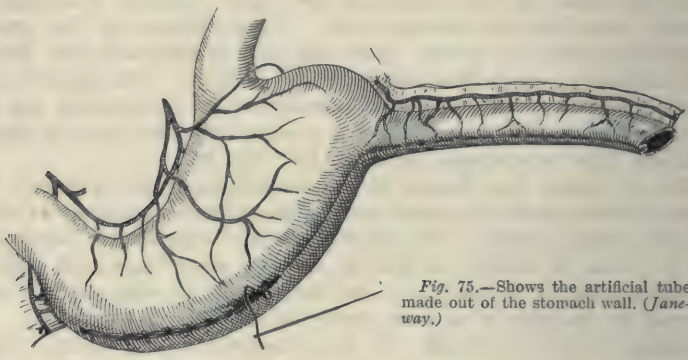


Fig. 75.—Shows the artificial tube made out of the stomach wall. (*Janeway.*)

Fischer[4] relates two interesting experiences and describes a new procedure. The first case was one of cancer about 10 cms. above the diaphragm. It was exposed by Torek's incision and cut across. After freeing the upper stump it was found that the section of the œsophagus was not free of the growth. The diaphragm was then opened with the intention of bringing the cardia into the thorax and carrying the excision further. This was impossible, owing to anchoring of the stomach by the gastrostomy. The freed lower stump was therefore passed into the abdomen, with the idea of dealing with it through the abdominal cavity after some days. The patient, however, succumbed to an infection originating in the lower stump. In a second case, the abdomen was first opened and the ribs retracted after Marwedel's method; the cardia was cut across, but this was done so high that secure suturing of the oral stump was impossible, and recourse had to be had to a tampon. The stomach was closed and gastro-

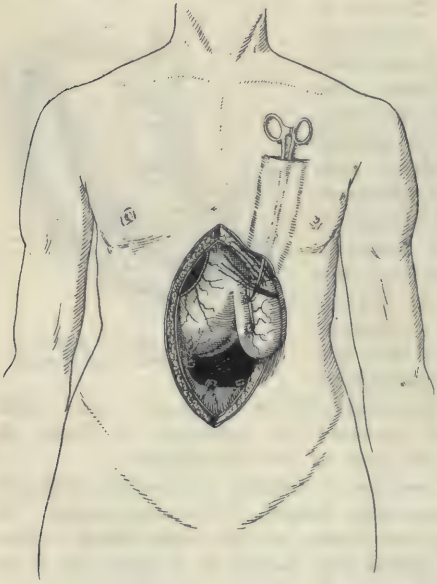


Fig. 76—Plastic fistulous gastrostomy: final stage. (*Janeway.*)

stomy performed. The patient, however, died from sepsis. Fischer proposes the following method : Opening of the abdomen, section of the cardia sufficiently low to admit of secure suturing of the upper stump (*Fig.* 77), gastrostomy with the passage of a tube through the stomach into the duodenum. After an interval, freeing of the œsophagus through Torek's intercostal incision ; incision of the diaphragm and delivery of the unopened stump ; suture of the diaphragm ; fixation of the stump outside the thorax after resection of the growth.

Baumgartner[5] records the following case. A female, age 60, presented a carcinomatous stricture of the œsophagus at the level of the seventh dorsal spine. On Oct. 2, 1913, a gastrostomy was performed, which improved the general condition and weight of the patient. On Nov. 13 an incision was made under general anæsthesia along the whole length of the seventh intercostal space, and the eighth rib removed. A progressive pneumothorax was permitted. The seventh and ninth ribs were forcibly retracted by an automatic retractor. The tumour was adherent to the pericardium, to the right bronchus, and to glands below the tracheal bifurcation. The right vagus was adherent and was cut. The œsophagus was severed above the diaphragm, and the lower end carefully closed with three layers of sutures. The tube was then freed in an upward direction, and the seventh and sixth ribs cut at their angles. Much difficulty was experienced in separating the mass from the pericardium and the right bronchus, and it was necessary to cut both vagi below their pulmonary branches. The tube was delivered through a cervical incision and brought out under the thoracic integument in the third left interspace. The patient died ten hours later, the cause of death being hæmorrhage into the right side of the chest. This was due to imperfect hæmostasis, a condition difficult to avoid if the patient is in much shock at the end of the operation. Baumgartner preferred a right transpleural route, because he says " on the right the aorta is not in the way, the agygos can if necessary be cut between ligatures ; the right pleura surrounds the œsophagus to a greater extent than the left, and consequently by a transpleural route the exposure from the right side is better."

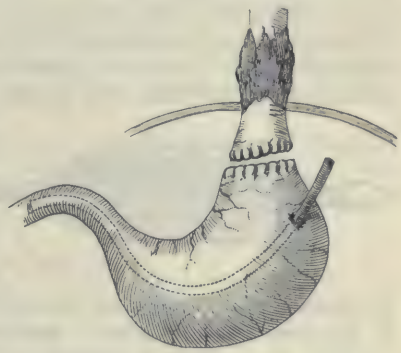


Fig. 77.—Fischer's method of resection of œsophagus.

References.—[1]*Surg. Gyn. and Obst.* 1913, ii, 614 ; [2]*Jour. Amer. Med. Assoc.* 1914, i, 100 ; [3]*Ibid.* 1913, ii, 93 ; [4]*Zentr. f. Chir.* 1913, 1809 ; [5]*Presse Méd.* 1914, 34.

ŒSOPHAGUS, DISEASES OF. *J. S. Fraser, M.B., F.R.C.S.*

Cancer.—Janeway[1] has found that dysphagia, which is the earliest symptom of œsophageal cancer, may be at first only temporary, and may disappear for a considerable time before becoming permanent. Other early symptoms are constant dull pain behind the lower end of the sternum, a tickling sensation in the throat, cough, and increase of mucus in the throat, or, in some cases, anorexia alone.

Cardiospasm.—Jordan[2] states that the essential features of this condition are: (1) A long history, extending over fifteen or even thirty years; (2) Difficulty in swallowing, or regurgitation of food and mucus after eating—this may be constant, or may partially or entirely intermit; (3) Malnutrition. The *x* rays are of the greatest service in diagnosis. The bismuth is seen to fall to the cardiac orifice and collect in the lower portion of the œsophagus, which in typical cases is greatly dilated. The shadow of the bismuth ends below in a conical point, through which a trace of bismuth trickles in some cases. Jordan has, however, seen nearly the whole of a bismuth meal still present in the œsophagus at the end of six days.

The problem of treatment is to get a **Bougie** or **Dilator** through the cardiac orifice. A reel of ligature silk is used; about a yard of silk is unwound, and a leaden shot is attached to the end; the patient now

Fig. 78.—Bougie for use in cardiospasm.

swallows the silk, and with the aid of the screen the shot is observed to slip through the stricture. The silk soon passes through the pylorus and travels through the intestines. The patient carries the reel in his waistcoat pocket, the silk projecting from the corner of the mouth and passing over one ear. When the distal end of the silk appears at the anus it is cut short as often as necessary. The object of the thread is to furnish a guide. It is therefore held taut while a special bougie (*Fig.* 78), with a perforated metal acorn at its lower end, is theaded over it and passed down. Above the acorn a rubber dilating bag is attached. When the bougie is seen by fluoroscopy to be in the stomach, the bag is inflated and slowly withdrawn. The improvement after dilatation is immediate, but it is usually necessary to repeat the dilatation several times, at intervals of a week or two. A relapse yields to treatment more readily than the original attack.

In the discussion which followed the reading of this paper, William Hill insisted on the necessity of visual inspection through the œsophagoscope. He had never yet seen a case of purely functional phrenocardiac stenosis, and held that there was no demonstrable sphincter in this region. Non-relaxation of the cardiac orifice was rather of the nature of want of co-ordination. Hertz stated that nearly every

museum in London contained an example of so-called 'idiopathic dilated œsophagus,' but on examination it was found that the cardiac sphincter was not hypertrophied. The only possible explanation was that some question of inco-ordination was involved. Leslie mentioned the case of a young man suffering from dilatation of the œsophagus, which could hold as much as two pints of food. The stomach was opened, but no cicatrix was found. A post-mortem examination showed that there was enormous distention of the œsophagus.

Lambert[3] gives a short history of the literature of cardiospasm, and states that the first method of treatment was by laparotomy and dilatation of the cardia by the surgeon's fingers passed into the stomach. Dilatation may be fusiform, pear-shaped, or ∞-shaped. The latter is the rarest variety, and is due to an increase in length of the œsophagus between its fixed points—the cricoid above and the cardia below. **Œsophago-gastrostomy**—on the lines of gastro-jejunostomy—may be performed either by a transpleural or a trans-peritoneal route. Cardioplasty, which is analogous to pyloroplasty, has been performed by Wendell. Lambert gives several excellent illustrations of his method of performing œsophago-gastrostomy by the transperitoneal route. The lower portion of the dilated œsophagus is drawn down through an opening in the diaphragm and anasto-mosed with the stomach.

Syphilitic Paralysis of the Œsophagus.—Saundby[4] records the case of a gentleman, age 35, who complained, in 1895, of his sight going dark at times, with giddiness but no loss of consciousness. He had suffered from syphilis twelve years before. The attacks began in the fingers of the right hand and ran up to the shoulder; his head was drawn to the right, and his speech became thick. The condition was relieved by the administration of iodide and bromide of potassium. In 1898 the patient again complained of giddiness and difficulty in articulation. There were no signs of locomotor ataxia. In 1902 the patient had difficulty in swallowing, though there was no obstruction to the passage of a sound. Antisyphilitic treatment brought about a rapid recovery. At this time the left hand could not distinguish between hot and cold. In 1904 he again complained of attacks of dimness of vision, and in 1913 he suffered from sleeplessness. Saundby believes that the difficulty in swallowing was undoubtedly of syphilitic origin, as it occurred as one of a series of syphilitic phenomena, which yielded rapidly to specific treatment.

Œsophagoplasty.—Meyer[5] states that Lexer and Frangenheim each succeeded, in 1910, in giving a patient with impermeable cicatricial stricture of the œsophagus a new extrathoracic useful tube by a series of plastic operations. They excluded and then transposed, under the skin of the chest, a coil of jejunum, the lower end of which was connected with a gastric fistula, and the upper end with the oral stump of the œsophagus.

Jianu has shown that the major curvature of the stomach can be used to form a tube, one end of which remains in connection with the

gastric fundus, while the other free end can be brought up under the skin of the thorax to a point not far from the clavicle. Roepke has tried this method on a patient, with complete success. Meyer performed the operation upon another case in 1912, and the patient was fed through a funnel passed into the new tube. Meyer holds that it is better to place the new tube just under the skin of the chest, rather than beneath the pectoral muscle. He hopes to be able to excise cancerous stricture of the œsophagus by opening the chest from behind. If enough of the œsophagus remains above the level of the cancer, it may be possible to join this to the new tube formed from the stomach.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1914, i; [2]*Brit. Med. Jour.* 1913, ii, 915; [3]*Surg. Gyn. and Obst.* 1914, i, 1; [4]*Brit. Med. Jour.* 1914, i, 239; [5]*Ann. Surg.* 1913, ii, 289.

OPTIC NERVE, TUMOURS OF. *A. Hugh Thompson, M.D.*

The best general account of this subject will be found in Parsons's "Pathology of the Eye,"[1] published in 1905. Byers, whose previous work on the subject will be found summarized by Parsons, has now brought the subject up to date.[2] Taking intradural tumours first, the great majority of these are growths the basis of which is an overgrowth of the fibrous connective-tissue elements of the nerve. A small minority—1 in 35 of those investigated—are endotheliomata. Extradural tumours are decidedly less common than intradural, in the ratio of about 1 to 5 or 6, but of these latter, probably about three-fourths are endotheliomata, and the remainder sarcomata. The fact that the great majority of tumours of the optic nerve, therefore, are non-malignant, might incline one to adopt an expectant attitude in all cases, and especially in those in which the rate of progress, judged by the proptosis and other symptoms, is, as often, very slow. Byers, however, does not subscribe to this view. From the symptoms, it is impossible to distinguish between extra- and intradural tumours, and between the malignant and non-malignant varieties of the latter. If an operation is to be done, it is easier, and has a greater prospect of success, the earlier it is undertaken. On these grounds he recommends operative interference, wherever possible, in every case where a definite diagnosis can be made. As to the operation itself, he says that Krönlein's method (by which the outer orbital wall is temporarily removed) is adapted only to the excision of small or at most medium-sized growths, and on the whole finds Knapp's method, by which the tumour is approached through an opening in the ocular conjunctiva, as more generally useful. The experience of others was voiced by Weeks,[3] who finds that the exposure of the tissues at the apex of the orbit is much more easy and satisfactory by a lateral opening than can be obtained through the natural opening in the orbit.

REFERENCES.—[1]Vol. ii, 693–715; [2]*Jour. Amer. Med. Assoc.* 1914, ii, 20; [3]*Ibid.* 24.

OPHTHALMITIS, SYMPATHETIC. (*See* EYE, INJURIES TO.)

ORAL SEPSIS. *Robert Hutchison, M.D., F.R.C.P.*

The subject of oral sepsis or pyorrhœa alveolaris still continues to engage much attention, and divergent views are expressed as to its treatment, especially by vaccines.

Turner[1] sums up the treatment of dental sepsis in the words "Clean and render cleansable." The mouth should be left in such a state by dental treatment that the patient can himself keep it clean. He adds, "When the patient's health is at stake the teeth must go." Colyer[2] is also an advocate of extraction in all the severer cases, whilst on the other hand Goodhart,[3] has entered a strong protest against the wholesale and unnecessary extraction of teeth for comparatively slight degrees of sepsis.

As regards the use of **Vaccines,** both Turner and Colyer have found them disappointing. Joseph Head,[4] on the other hand, advocates them strongly, using a mixed vaccine prepared from all the organisms isolated in the given case. There is no specific organism or vaccine.

Tweddell[5] claims to have had very good results from the administration of large doses of **Dilute Sulphuric Acid** (20- to 30-min. doses), in the same way as has been proved successful in the treatment of boils and other suppurative conditions.

All are agreed that prevention of oral sepsis is better than its cure. The *preventive* measures consist in efficient nasal breathing, thorough mastication, the avoidance of 'sticky' foods, especially at the end of a meal, and thorough cleansing of the teeth and interdental spaces. For the latter purpose the regular use of **Dental Floss Silk** by the patient is strongly recommended. Turner gives the most elaborate instructions for its use.

Zinc Ionization alleged to be valuable (*p.* 73). *See also p.* 23, for the use of **Ortizon** in the preparation of hydrogen peroxide mouth washes.

REFERENCES.—[1]*Brit. Med. Jour.* 1914, i, 1244; [2]*Pract.* 1914, ii, 301; [3]*Lancet,* 1914, ii, 262; [4]*Jour. Amer. Med. Assoc.* 1913, ii, 2232; [5]*Med. Rec.* 1914, ii, 16.

ORIENTAL SORE. (*See* LEISHMANIASIS.)

OROYA FEVER. (*See* VERRUGA PERUVIANA.)

OTHÆMATOMA. (*See* EAR, DISEASES OF.)

OTITIS MEDIA. (*See* EAR, DISEASES OF.)

OTOSCLEROSIS. (*See also* EAR, DISEASES OF.)

J. S. Fraser, M.D., F.R.C.S.

PATHOLOGY.—Fraser and Walker[1] divide opinions as to this into three groups; (1) That it is a chronic inflammatory process starting from the mucoperiosteum of the middle-ear; (2) That it is a hereditary developmental anomaly in the post-embryonic growth of the labyrinth capsule; and (3) That it is a tropho-neurosis. Otosclerosis has also been associated by various writers with osteomalacia, rheuma-

toid arthritis, disorders of the accessory thyroid or pituitary glands, and affections of the sympathetic nervous system. The writers hold that at least some cases of otosclerosis are due to a chronic, locally infective, inflammatory process, starting in the mucoperiosteum of the middle ear in the region of the anterior margin of the oval window, and resulting in bony ankylosis of the stapes. It appears probable that catarrhal otitis may linger in the region of the oval window and, in time, invade the bone of this region. It must not be forgotten that the tympanic ossicles and joints are almost the only bones and joints in the body that are covered merely by mucous membrane. They appear therefore to be specially liable to infection from the surface. The factor of heredity, so marked in otosclerosis, may merely amount to this, that in certain families the auditory apparatus is congenitally weak, and unable completely to throw off an attack of acute otitis media, which lingers in the mucoperiosteum in the region of the oval window and gradually invades the bone.

Clinical Aspect.—Fraser and Walker have analyzed 153 cases, and found that in the great majority the tympanic membranes were entirely normal. Of these cases, 64 per cent were females, and only 36 per cent males. In the great majority the affection began under thirty. Deafness was more or less present in all cases, and in the great majority there were ' noises in the ear.' Giddiness and pain were occasional symptoms. The writers call attention to the mask-like or expressionless appearance of the patients. The writers have noticed the partial loss of tickling sensibility in the external meatus—a symptom first described by Froeschels—but they do not attach much importance to this, as it occurs in other ear diseases. In 105 out of 117 cases the Eustachian tubes were patent, and in none was any improvement in the hearing obtained after inflation of the middle ear. Examination of the nose showed normal conditions in most cases. Functional examination of the ear gave the following results : Bone conduction lengthened in 94 out of 101 cases ; bone conduction better than air conduction in all but the most advanced cases. The writers regard total loss of perception by air conduction of the C 32 fork as the most important clinical sign. The watch was well heard by bone conduction in all but the most advanced cases. Patients suffering from otosclerosis described their noises as buzzing, booming, ringing, or as resembling the sound of the sea or wind. Seventy-five per cent of the cases examined stated that they heard better in a noisy place (paracusis Willisii). The writers found that in early cases with fairly good hearing, Rinné's test only gave a negative result (bone conduction better than air conduction) with the lower-pitched forks, whereas in the later cases, with bad hearing, Rinné's test was negative up to C 2048. With regard to the upper tone limit, the following results were obtained : Early cases with comparatively good hearing had an upper tone limit approaching the normal (18,000 double vibrations per second), while in late cases with bad hearing it was greatly reduced (8,000 double vibra-

tions). The writers also examined the vestibular apparatus in twenty cases, and found that in the earlier stages of the disease the reaction time to cold syringing was normal, whereas in the later cases the reaction time was shortened. This appears to point to a certain amount of hypersensibility of the vestibular apparatus in the late stage of otosclerosis.

TREATMENT.—Jenkins[2] states that satisfactory treatment of otosclerosis depends on the solution of the problem of the pathology of this condition. Jenkins believes that in otosclerosis there is a change in the labyrinthine fluids. Numerous measures have been tried, including inflation of the tympanic cavity with medicated vapours, repeated blistering, and the complete mastoid operation. Massage, galvanism, ionization, fibrolysin, radium, and *x* rays have all been employed. Phosphorus has been recommended by some authorities, potassium iodide by others ; Bruehl gives thyroid gland. Pituitary, ovarian, and testicular extracts have been tried. Jenkins has personally tried most of the above-mentioned methods of treatment, and has not found any of the least value. He believes that massage and treatment by sounds do harm, and holds that the results of operative procedures have been bad. He has opened the external semicircular canal, and obtained an immediate good result ; within two or three months, however, the condition of the patient was almost as bad as before.

With regard to the general management of a case, Jenkins holds that the patient should be told the nature of the deafness, and that no hopes should be raised of improvement following operations on the nose, etc. The patient should be informed that the progress of the disease is usually slow, and that the great majority of cases do not become stone deaf. Patients should avoid noisy surroundings. Nervous exhaustion and extreme cold have a bad effect. He should see a surgeon from time to time, and should be warned against trying advertised remedies to improve the hearing. In the early stages the patient is better without an instrumental aid to hearing. Later on, when he cannot hear a speaker in a hall, the use of an ear trumpet may give considerable assistance. He should, of course, cultivate lip-reading. A carefully selected **Electrical Instrument** (pocket telephone) may be of great value, and Jenkins strongly recommends the use of a well-fitting ' auricle.'

REFERENCES.—[1]*Jour. Laryngol.* 1914, 513 ; [2]*Ibid.* 520.

OZÆNA. (*See* NOSE, DISEASES OF.)

PANCREAS, SURGERY OF. *E. Wyllys Andrews, M.D.* (*Chicago*).

Lacouture and Charbonnel,[1] in a study of operations for *pancreatic stone*, have analyzed 70 cases, in which the diagnosis was confirmed by operation or autopsy. They also quote Mayo Robson and Cammidge, who have reported 60 previous cases, and Rindfleisch, who had found 3 cases of pancreatic stone in 3000 autopsies. The

characteristic symptom in many of their cases has been pain, of a violent character, due to irritation of the solar plexus, possibly by the migration of the stone. These cases should be considered surgical, and rarely medical.

REFERENCE.—[1]*Rev. de Chir.* 1914, ii, 28.

PANCREAS, TESTS FOR FUNCTIONAL CAPACITY OF.

O. G. Gruner, M.D.

An excellent critical review of the whole of this subject is presented by Arthur F. S. Sladden.[1] He divides the tests into two groups : (1) Tests of external secretion, dependent on changes in the ferment content of the pancreatic juice ; (2) Tests dependent on changes in the other functions of the pancreas. The former group may be subdivided into two according as the gastric or intestinal contents are examined. The second group is concerned with the examination of the urine, and Loewi's mydriasis reaction.

Analysis of material obtained per os is achieved either by causing the duodenal contents to regurgitate into the stomach and there obtaining them (oil-test breakfast), or by duodenal intubation. Sladden rightly objects to the former on the ground of uncertainty of securing regurgitation from duodenum to stomach, and on the ground that the laboratory examination is itself protracted. Intubation depends on passing metal capsules attached to silk threads into the duodenum, proving their presence there by the *x* rays, and subsequently withdrawing. Admixture with gastric contents cannot be provided against, and the patients object to the method. The variations in activity of the pancreatic juice which occur in healthy persons form an additional difficulty.

Sahli's method, in which hardened gelatin capsules containing drugs are swallowed, suffers from the difficulty that the capsule may not reach the duodenum within the prescribed time. One would suggest including bismuth or barium, and waiting till it is seen to be in the duodenum, by *x* ray. Sladden does not speak encouragingly of Schmidt's beef-cube method (small cubes of beef muscle hardened in alcohol, and wrapped in silk gauze), to aid the identification of the cubes in the fæces.

Azotorrhœa, the finding of an undue amount of nitrogen in the fæces, is dismissed as only within the reach of skilled chemical pathologists, not available in the ordinary conditions of practice. On the other hand, this author considers that pancreatic insufficiency is probably the most usual cause of azotorrhœa. *Creatorrhœa* is highly spoken of. The normal fæcal matter yields at most one or two muscle fibres per microscopic field. In pancreatic disease the fibres may become very numerous. The fallacies are diarrhœa, abnormal peristalsis, achylia gastrica. The *tryptic power* of the fæces may be tested, but the information is only useful to this extent, that a finding of no trypsin is of more value as a sign of disease of the pancreas than finding of trypsin is as a sign of no disease of the pancreas. As to *steatorrhœa*,

Sladden sums up the case thus : The total fat may be normal in cases of pancreatic disease. Fat may be excessive without pancreatic disease. If the fat excretion relative to the intake exceeds 20 per cent, and if administration of pancreatic preparation improves utilization, then there is a strong probability of pancreatic disease. A total fat content of dried fæces of much over 30 per cent means either pancreatic or biliary insufficiency, or anomalies of absorption or peristalsis. If of this total fat, the split fat be less than 60 per cent, then it is very likely that the pancreas is diseased. *Lipase* in fæces is dismissed by Sladden as being determinable only with difficulty. He speaks more favourably of estimating the *diastatic* power of the fæces. Lecithin is present in the fæces in larger proportion than normal in cases of pancreatic disease.

Cammidge's test is put on one side save in the broad interpretation which that author himself now places upon it : that it is an index, not necessarily of pancreatic disease, but of a disturbance of carbohydrate metabolism which may or may not be associated with disease of the pancreas.

Diastase in Urine.—Brown and Wharton Smith[2] report on a study of urinary diastase. If there be no renal disease, a marked lessening of the amount of diastase in the urine signifies pancreatic insufficiency. Two c.c. of urine are incubated at 37° C. with 2 c.c. of 0·1 per cent solution of starch. After half an hour the mixture is quickly cooled, and a few drops of fiftieth-normal iodine are added. A number of tubes are put up with different amounts of urine, and the last tube before the blue appears is selected as the reading. The unit chosen means that 1 c.c. of 1 per cent starch is completely converted into dextrin in half an hour. Normally the content is 6000 to 12,000. In pancreatic disease the amount falls to from 300 to 500. Humphry[3] speaks well of this method of studying pancreatic function, but also employs Loewi's test (instil a few drops of 0·1 per cent adrenalin chloride solution into the eye. If dilatation of the pupil takes place within an hour the test is positive). For the diastase test, he uses a different unit, namely, the amount of 0·1 per cent starch converted into dextrin in half an hour by 1 c.c. urine. Normally it is 10 to 20. A marked increase means pancreatic disease. Further investigation is required.

References.—[1]*Quart. Jour. Med.* 1914, July, 255 ; [2]*Johns Hop. Hosp. Bull.* 1914, 213 ; [3]*Brit. Med. Jour.* 1914, i, 1229.

PARALYTIC DEFORMITIES. *F. W. Goyder, F.R.C.S.*

Spastic Paraplegia (Little's Disease).—Muirhead Little[1] says that since this is a radical lesion incapable of true cure, the aim of treatment must be to restore the lost balance by interfering at some point or points in the neuromuscular combination. The mental capacity is an important factor in success. In a case of doubtful intelligence it is advisable to give the patient the benefit of the doubt, as surprising mental improvement often follows surgical interference. Little is in

favour of operation at about the age of three years. A combination of methods—apparatus, tenotomy, neurotomy, and re-education—is usually necessary. Lengthening of tendons is better than simple section. The over-corrected position must be maintained for weeks. At the knee, section of the biceps with lengthening of the semitendinosus and semimembranosus is satisfactory and does not cause genu recurvatum. If tenotomy is found not to overcome spasm sufficiently, operations on the nervous system become necessary. Little finds that Stoffel's partial neurectomy is unreliable (*see below*). As to Förster's operation, he considers that in suitable cases it is quite justifiable. On the whole, he thinks that intrathecal high operation is better than section of the roots outside the canal.

Proof that simple tenotomies, followed by long-continued over-correction in plaster and by exercises, give excellent results in this condition, is furnished by Harris,[2] who reports the results in thirty-three cases. Great improvement can only be expected if the child's mental condition approximates to the normal. Twelve paraplegias were treated, with only one failure ; scissor-leg deformity being overcome by tenotomy of the adductors, and fixation in abduction, for two up to four months. Alcohol injection of nerves produced good results, but they were temporary. Tubby's operation of transferring the pronator radii teres to act as a supinator was successful once in four cases (*see below*). Plastic operations appeared to offer no advantages over simple tenotomy for contracted tendon.

Hohmann,[3] on the other hand, finds that tenotomy with transplantation is apt to result in relapse. He considers that Förster's method of division of the posterior nerve roots is very dangerous. He is therefore a strong advocate of Stoffel's operation. He points out that the over-acting muscles have a common nerve supply, i.e. they are grouped, and that Stoffel's operation lowers considerably the conductivity of impulses through the peripheral motor nerves implicated. The procedure consists in partial division of the motor nerves supplying the affected region.

With this method relapses are uncommon, but no relief is afforded to athetoid movements. Transient neuralgic pains may follow the operation. His best results have been in cases of Little's disease ; good results have followed also in cerebral hemiplegia in children in almost every case, and in spastic contractures after cerebral hæmorrhage in adults. He does not recommend it if there are strong choreiform movements, in hydrocephalic idiocy, or if there be real paralysis of muscles as well as spasm. In this last class, plastic operations on the nerves are better.

Paralysis of the Supinators of the Forearm.—Vulpius[4] finds Tubby's operation unsatisfactory. He points out that in complete palsy of the forearm, pronation occurs from the weight of the limb. Supinator spasm is very rare. Spastic paralysis in this region almost always results in pronator spasm. Permanent pronation is most disabling, especially if the rest of the arm is sound. It is best to fix the forearm

in a position midway between pronation and supination, as writing is impossible when full supination is present. This may be done by means of Albee's tibial bone graft (*see* BONE) in the following manner: The length of the graft has to be equal to the breadth of the radius and ulna plus the width of the interosseous space at the selected level near the middle of the forearm. It is obvious that this distance will vary according to the degree of supination of the forearm. That length must be chosen which corresponds to the width in the mid-position between pronation and supination. The radius and ulna are exposed at the same level, and the periosteum turned back where the graft is to be fixed. On the radius and ulna a groove is chiselled out the same width as the graft. Into this groove the graft is pushed and the periosteum sewn over it. The forearm is fixed in plaster in the required position for six weeks. The union of the graft with the forearm bones limits pronation and supination, and fixes the bones in a position favourable for use. Good results follow the operation. The exact level at which the graft is put is not stated, nor is the aspect; but presumably the extensor aspect is meant. *Fig.* 79 gives a diagrammatic view of how the graft lies.

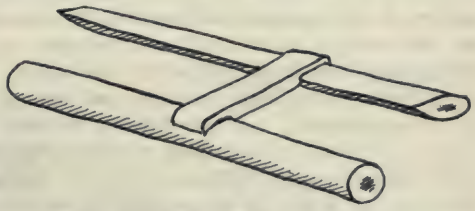


Fig. 79.—Bone graft to limit paralytic pronation. (Vulpius.)

Souttar[5] describes a new operation for *hip contractures in poliomyelitis*. The usual contractures of the soft tissues at the hip hold the thigh flexed and abducted, and involve a shortening more or less of all the soft tissues on the outer and anterior region of the hip. In mild cases they may yield to manipulation or stretching or tenotomies. In severe cases tenotomy or even myotomy may be unsatisfactory; hence a more radical operation which is less difficult than myotomy has long been required. The author makes a longitudinal incision posterior to the anterior superior spine. The superficial structures are retracted, and the anterior superior spine and iliac crest exposed. The muscles and fascia attached to these on the femoral aspect are separated from the bone subperiosteally with an osteotome. They are next pushed downwards by gauze or blunt dissector, clearing off the periosteum and soft tissues from that part of the pelvis below the anterior superior spine. Hyperextension of the hip pulls these tissues down with it. The limb is fixed in a position of hyperextension and slight adduction till healing is complete. Unlike extensive myotomies, there is practically no bleeding, the operation does not require much surgical skill, and the contracture is definitely relieved.

Albee's mode of dealing with *paralytic dislocation of the hip* is described under DISLOCATIONS.

Paralytic Foot-drop.—One of the commonest and most crippling results of infantile palsy, this is probably the most difficult to treat. After lengthening the contracted flexors, and allowing sufficient time for the recovery of the paretic and overstretched extensors, in a large percentage of cases the paralysis of these latter remains permanent. Until recently, arthrodesis with transplantation of tendons and the use of silk ligaments have given the best results. Shortening of muscles is open to the objection that stretching subsequently takes place and the deformity returns. Rugh[6] describes Putti's method of dealing with the extensor tendons and implanting them into the tibia. The tendo Achillis is made long enough to allow a right-angled position of the foot. The tibial crest and the anterior tendons are exposed. These are separated, and all are severed from their muscle attachments as high up as possible. The tibia is then freed about the centre of the incision, and an oblong hole of sufficient size to receive all the tendon ends, mortised through it. The periosteum is then lifted from the front surface to the tibia. A tendon end is passed through the hole from one side and drawn taut, the foot being held at a right-angle. Another tendon is next passed through from the other side, and the remaining tendons alternately till all are threaded. The ends are next drawn under the raised periosteum and firmly stitched in place to tendons, periosteum, and tendon ends. The parts are fixed for a couple of weeks by a splint. The only disadvantage is that the toes ultimately become flexed through dropping downward of the metatarsophalangeal joints; hence flexion of the distal phalanges of the toes and hammer-toes result. Rugh suggests that the tendons of the dorsal flexors might be engrafted into the distal ends of the metacarpals. The same method is applicable to any type of paralytic deformity of the foot.

Paralytic Talipes Calcaneovalgus, with instability of the ankle-joint.—Lord[7] obtains good results from Whitman's operation.[8] The steps of the operation are as follows:—

1. The ankle joint is exposed by an incision on the outer side.

2. The astragalus is removed.

3. (*a*) A shaving of bone is removed on the outer side at the calcaneocuboid joint to articulate with the external malleolus; (*b*) Partial separation is made of the inferior calcaneonavicular ligament on the inner side to make a socket for the internal malleolus; (*c*) The cartilage is removed from the inner surface of the two malleoli, the foot displaced back, and the malleoli are placed as described.

4. An opening is made in the Achilles tendon, through which the ends of the peroneal tendons are threaded, and to which they are stitched, after which they are reunited to their distal portions. The foot is fixed by plaster for four weeks in a position of marked equinus.

6. At the conclusion of this time the equinus is diminished but not abolished; an ambulatory plaster is then applied and worn for five months.

7. A raised sole, and a heel still more raised, are then fixed to the boot.

A satisfactory operation for this condition should get rid of cavus and calcaneus and prevent its recurrence, and at the same time give stability to the joints. Hence, removal of the astragalus is an integral part of the operation, while the backward displacement of the foot and reinforcement of the tendo Achillis by the peronei give balance to the new position. Shortening is inevitable, but it can be compensated for, and the increased stability more than counteracts this disadvantage. The after-treatment is important.

Whitman finds this operation of service also in other forms of paralytic talipes associated with lateral instability, e.g. equinovalgus. In older patients with complete paralysis of the extremity, if arthrodesis of the knee is also done, a stable limb results. It is useful for tuberculous ankle, for ankylosis to restore mobility, and for deformity and limitation of movement due to fracture. He arranges the functions of the foot in the order of their importance, thus : to serve as a secure support, to balance the body, and last to propel it. Calcaneus is the most important of all forms of talipes, because it is progressive ; after this operation the condition improves as time passes. In paralytic cases, whenever astragalectomy is performed, the foot should be displaced back to equalize the balance. The point of most importance is that, after operation, no permanent apparatus is needed.

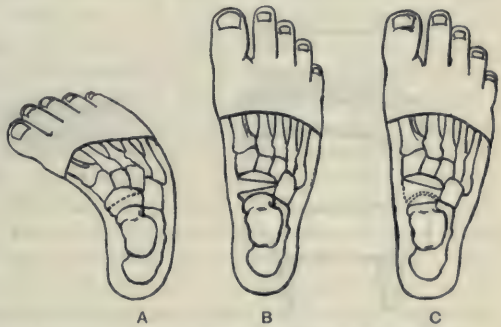


Fig. 80. —ALBEE'S OPERATIONS FOR PARALYTIC AND CONGENITAL TALIPES.

A and B, Osteotomy of scaphoid in congenital talipes. The foot is straightened, and a tibial or cuboid graft inserted. No joint is interfered with. C, Excision of the astragaloscaphoid joint in paralytic talipes : a tibial graft is put in, and the joint made immovable.

Albee[9] contrasts the treatment of paralytic with that of congenital talipes. In the latter variety there is no hypermobility and instability. In both conditions he employs a bone-graft. In paralytic equinovarus, he opens the astragaloscaphoid joint, and removes a slice of cartilage on each side of the joint (*Fig.* 80). The foot is then forcibly straightened, and a wedge-shaped tibial graft, large enough to correct the deformity, is pushed and retained in place by kangaroo tendon suture. When union occurs, the astragaloscaphoid joint is abolished. The paralytic peronei may be used as ligaments. In congenital club-foot, on the other hand, there is no hypermobility of the joints, and hence no joint need be interfered with. The scaphoid is split vertically, and the graft forced between the separated halves.

The graft should be $\frac{1}{8}$ to $\frac{1}{4}$ in. larger than the gap. If the deformity is severe, a wedge taken from the outer side of the foot may be used as the graft. Tenotomy of the tendo Achillis is done if required. (*See also under* BONE for other uses of the bone-graft.)

For severe valgus deformity, whether paralytic or due to other causes, Katzenstein[10] recommends the use of an artificial ligament made from a rectangular piece of tibial periosteum. (*Figs.* 81, 82). If bone formation should occur in this, there is no disadvantage. Its excessive formation is prevented by the method of folding and applying the graft (*Fig.* 82). The bone surface is stitched together except at the ends, which are stitched to the internal malleolus and to the navicular under the periosteum.

Fig. 81.—Katzenstein's periosteal ligament: method of preparation.

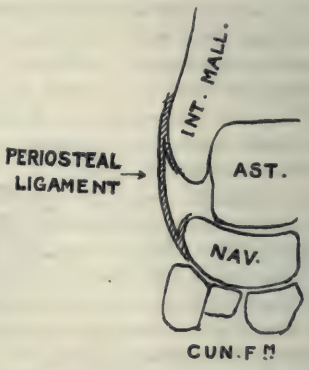


Fig. 82.—Katzenstein's periosteal ligament: application for paralytic valgus.

This manœuvre is not recommended for a routine flat-foot operation. For this purpose he advocates tanning of the tibionavicular ligament by injection into it of 1 to 2 c.c. of a 4 per cent solution of formaldehyde. Afterwards the foot is fixed in plaster in the varus position.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 1132; [2]*Boston Med. and Surg. Jour.* 1913, ii, 82; [3]*Münch. med. Woch.* 1913, 1368; [4]*Berl. klin. Woch.* 1914, 241; [5]*Boston Med. and Surg. Jour.* 1914, i, 384; [6]*Ann. Surg.* 1914, i, 432; [7]*Jour. Amer. Med. Assoc.* 1913, i, 1374; [8]*Med. Rec.* 1914, i, 47; [9]*Surg. Gyn. and Obst.* 1914, i, 699; [10]*Berl. klin. Woch.* 1914, 635.

PARATYPHOID FEVER. *E. W. Goodall, M.D.*

An outbreak of paratyphoid fever, affecting twenty-seven persons in five households, due to the eating of cheese infected by *B. paratyphosus B*, has been recorded by Symanowski.[1] Two cases of paratyphoid fever with severe symptoms, in which rapid improvement very quickly followed the employment of a **Vaccine**, have been reported by W. M. Crofton.[2] As both *B. paratyphosus B* and *B. coli* were obtained

from the stools, a mixed vaccine of the two organisms was used. The initial dose was in one case 5 million, increased every few days up to 50 million. In the other case only two doses were required, one of 2½, the other of 5 million.

REFERENCES.—[1]*Zeits. f. Med.* 1913, Sept. 20 (*Pub. Health*, 1914, 1135); [2]*Brit. Med. Jour.* 1913, ii, 1373.

PAROTID GLANDS, INTERMITTENT SWELLING OF.

Robert Hutchison, M.D., F.R.C.P.

Brasher[1] describes an interesting case of this rare condition in a female patient, age 26, in whom painful swelling of the parotids, with symptoms closely resembling those of mumps, recurred at intervals of a few months for a period of years. The cause was quite obscure, but in one attack a swab taken from the interior of the parotid duct yielded a pure culture of *M. catarrhalis*. The patient was vaccinated against this organism, with the result that she remained free from attacks for a year, after which, however, they returned as before.

In another article[2] the previous literature of the subject is dealt with. "Seven cases have been recorded by Goebel, Remouchamp, Kussmaul, Lange, and Lüders. Only one patient was a woman; of the six men, two had had syphilis, but although both received energetic antisyphilitic treatment, the recurrent inflammation of the parotid glands continued. In Kussmaul's case the periodical swelling was followed by escape of fibrinous plugs from Stenson's ducts, accompanied by a free flow of saliva. In Remouchamp's case (a man of 85, who had suffered from this disease for fifty-nine years) examination of the saliva showed that it was alkaline, rich in mucin and ptyalin, and that it contained pus-cells, large nucleated leucocytes, fragments of leucocytes, streptococci and short gram-staining rods, and a blood-count revealed a marked degree of leucocytosis. This appears to be the only case in which a bacteriological examination of the saliva has been made. Lüders considers that the disease (in his two cases) was due to 'chills,' and the writer of the article thinks that "the above cases were probably due to catarrh of the mucous membrane lining the ducts of the glands.

"Drugs appear to have had little effect upon the swelling, and the treatment consisted chiefly of fomentations during an attack and subsequent massage of the glands. In one case only, that of a woman of 39, was there any abscess-formation; this occurred seven years after the first attack, and the abscess was opened and drained."

REFERENCES.—[1]*Bristol Med.-Chir. Jour.* 1913, 238; [2]*Brit. Med. Jour.* 1912, ii, 328.

PEDICULOSIS CAPITIS. *E. Graham Little, M.D., F.R.C.P.*

Sobel[1] considers hardly enough importance is attached to this disease, which in all large cities accounts for a considerable amount of illness. The existence of the parasite is an index of dirty conditions which are often the forerunners of serious illness. The glandular enlargements which are its accompaniments are possibly predisposing

factors for the development of tubercle. Pediculi are carriers of infective diseases. Pediculosis causes insomnia, general nervous irritability, anæmia, and lowering of the vitality. The interference with the patient's school attendance is a collateral and not negligible mischief.

The routine method followed in the treatment of this condition is thus described :—

" *Instructions to Parents on the Care of Children's Hair and Scalp.*— Children affected with vermin of the head are excluded from school. The following directions will cure the condition :

" Mix one half pint of sweet oil and one half pint of kerosene oil. Shake the mixture well and saturate the hair with the mixture. Then wrap the head in a large bath towel or rubber cap so that the head is entirely covered ; the head must remain covered from six to eight hours. (Tincture of larkspur may be used instead of oil mixture. The directions for use are the same.)

" After removing the towel, the head should be shampooed as follows :

" To two quarts of warm water add one teaspoonful of sodium carbonate. Wet the hair with this solution, and then apply Castile soap and rub the head thoroughly for about ten minutes. Wash the soap out of the hair with repeated washings of clear warm water. Dry the hair thoroughly.

" If the head is shampooed regularly each week as above described, it will cure and prevent the condition of 'nits.' "

It is a curious observation, that the heads of negro children are relatively seldom affected. Sobel ascribes this to the frequent combing practised by the parents in the endeavour to control the curliness of the hair which differentiates the negro child unfavourably from his white classmate.

REFERENCE.—[1]*N.Y. Med. Jour.* 1913, ii, 656.

PELLAGRA. *Sir Leonard Rogers, M.D., F.R.C.P.*

A summary of the first progress report of the Thompson-McFadden Pellagra Commission has been published,[1] but contains little beyond what was recorded in the MEDICAL ANNUAL, 1914. Their present conclusions are that the disease is in all probability a specific infection communicable from person to person in some unknown way. Diet is not the cause of the disease, although an insufficient diet may be of considerable importance as a predisposing cause. They found no evidence whatever incriminating *simulium* flies ; but if the infection is distributed by a blood-sucking fly, *Stomoxys calcitrans* appears to be the most likely carrier. They are inclined to regard intimate association in the household, and the contamination of food with the excretions of pellagrous patients, as possible modes of infection.

P. A. Nightingale[2] further discusses an outbreak in the Victoria Gaol, Rhodesia, which he has already described as zeism, but which Sambon considers to be pellagra. The cases began to occur three and a half months after a change of diet to mealie meal alone, owing

to the failure of the rapoko crop. The former is steam-milled, the entire husk, with highly nutritive material, being removed in the process. On issuing rice the occurrence of fresh cases stopped ; but it was not until rapoko was again obtained that all the cases rapidly improved. There was no evidence of infection, and the prisoners had not been near any running water. Clinically, the symptoms resembled pellagra as regards the alimentary system, but differed markedly from it in the complete absence of nervous symptoms, while the skin lesions were not seasonal or recurrent, and had a different distribution, not affecting the hands, but chiefly involving the extensor surface of the forearm. The prognosis was also good, no case terminating fatally. In addition to a proper diet, **Cod-liver Oil** was very valuable, but arsenic was useless.

Emma M. Johnstone[3] describes and illustrates a case in Holloway Sanatorium, Virginia Water. F. E. Rainsford[4] reports on a case in an imbecile in Co. Dublin, said to be the first noted in Ireland. In America, J. B. MacDonald[5] describes two cases in Massachusetts, and discusses the recent history of the disease in the United States ; and E. W. Gehring[6] records three cases from Portland, Maine, who had never been out of the state. J. Drummond[7] describes a case in Natal, together with the results of a post-mortem examination. He also thinks Nightingale's Rhodesia cases were pellagra. C. A. Hogg[8] describes four cases in New South Wales with pellagra-like skin eruptions, in one of which the condition of the mouth also agreed with that disease. Gnats belonging to the *Simulidæ* are remarkably few in Australia, so the occurrence of pellagra there will throw great doubt on that insect being the carrier of the infection. Intestinal symptoms were absent in the Australian cases.

H. S. Stannus[9] has published a further elaborate account of pellagra in Nyassaland, where he recorded the presence of the disease in 1911. The disease appears to be widely prevalent over the Protectorate, while it assumed epidemic proportions in the central gaol, data concerning 131 cases being shown in elaborate tables. The rash was noted to involve different areas in regular sequence, beginning on the forearms, hands, and arms, and extending to the supraclavicular regions, neck, face, legs, and body in the order named, exact symmetry being observed throughout. A sodden and thickened condition of epithelium, with white cracks seen at the angles of the mouth, the author considers diagnostic of the disease, even in the absence of other symptoms. Exfoliation of the epithelium of the tongue leaving a smooth red surface is characteristic. It also involves the buccal mucous membrane. Epigastric pain is frequent. Relapses occur, usually with severer symptoms, and often terminate fatally. All ages were attacked. *Simulidæ* were found breeding in many of the streams. Diets were studied, and maize could be excluded as the one cause of the disease ; but there was some evidence in favour of it being caused by intoxication due to the ingestion of damaged grain, whether it be rice, maize, or other. On the other hand, there

were no facts militating against the simulium theory of infection. C. R. Box[10] reports a further case of pellagra in an English child. Alessandrini and Scala[11] publish a report with coloured illustrations of pellagra, and conclude that it is not dependent on a maize diet, but that it is almost exclusively associated with a clay soil, possibly in relation to silica.

G. M. Niles[12] takes a more optimistic view of the treatment than most writers, as a result of an experience of over 600 cases. The essentials are good **Hygiene,** including the prohibition of all alcohol, the **Prohibition of Maize** from the diet, but free use of fresh meat, eggs, milk, etc. He administers ampoules of **Iron Arsenite** solution (16 min.) and **Sodium Cacodylate** solution ($\frac{3}{4}$ gr. of the salt) on alternate days, injecting them with aseptic precautions, and giving one daily for about two weeks, and afterwards every other day. After the acute symptoms seem to be controlled, two injections are given weekly for several months. For anæmia, **Green Citrate of Iron** and **Glycerophosphate Compound** may be substituted. **Fowler's Solution** and **Potassium Iodide** are also given. For diarrhœa, **Bismuth,** β-**Naphthol,** and **Resorcin** or **Tannigen** are used.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 8 ; [2]*Brit. Med. Jour.* 1914, i, 300 ; [3]*Lancet,* 1913, ii, 1114 ; [4]*Ibid.* 1759 ; [5]*Boston Med. and Surg. Jour.* 1913, ii, 567 ; [6]*N. Y. Med. Jour.* 1913, ii, 1212 ; [7]*S. Afric. Med. Rec.* 1913, 416 ; [8]*Austral. Med. Gaz.* 1913, 357 ; [9]*Trans. Soc. Trop. Med. and Hyg.* 1913, 32 ; [10]*Brit. Med. Jour.* 1914, ii, 397 ; [11]*Lancet,* 1914, ii, 713 ; [12]*Jour. Amer. Med. Assoc.* 1914, i, 285.

E. Graham Little, M.D., F.R.C.P.

Hogg[1] reports four cases of a skin eruption indistinguishable from pellagra and exhibiting other symptoms in accordance with that diagnosis. All four patients were insane, and inmates of an asylum in Australia at the time of showing the skin eruption. In all there were symptoms of acute toxæmia, associated with deposition of pigment in the skin, especially marked on the back of the hands, resembling sunburn, i.e., commencing with erythema and followed by desquamation. All the cases ended fatally, within eleven days to three months of the advent of skin symptoms. Diarrhœa and gastric symptoms were not present ; but muscular weakness with loss of weight was marked and progressive in all. The clinical aspect rather recalls the description of the types of typhoid pellagra. The co-existence of insanity masked the nervous symptoms too completely to allow of their being recorded.

Willcocks[2] observes that some forty cases of pellagra were recorded in the United Kingdom during the year 1913, and emphasizes the importance of the recognition of the disease by the practitioner. In about 20 per cent of the reported cases, the diagnosis must be taken as having been doubtful. The commonest limits of age were 20 to 50, but several cases occurred both above and below these limits. A large proportion of the records were made in insane asylums. The only symptom mentioned in every case of twenty-three inquired

PLATE XLIV.

PELLAGRA WITH SKIN ERUPTIONS

Hand of A. B., suffering from pellagra. The picture shows the deep brown pigmentation of the fingers and dorsum, with the wrinkling of the skin which precedes exfoliation.

E. Graham Little, M.D.

PLATE XLV.

PELLAGRA WITH SKIN ERUPTIONS

A. B. Pellagra. The picture shows the general flushing of the cheeks and forehead, with deep brown pigmentation of the cheeks and back of neck.

E. Graham Little, M.D.

into by the writer, was the rash on the backs of the hands and round the wrists. Diarrhœa was also a very constant symptom, being recorded in all but six of the series. Willcocks reports a new case which came under his observation, at Waterloo Hospital, in a girl, age 14.

The importance of the skin manifestations in the diagnosis of pellagra is exemplified in a case reported by Graham Little.[3] (*Plates XLIV and XLV.*) This case was in the first instance seen by Dr. Clarke, of Horley, who made the diagnosis on the advent of the skin lesions, which he recognized as being the same as depicted in a plate in the MEDICAL ANNUAL of 1914. The diagnosis had remained obscure until the characteristic changes occurred in the skin. The patient was a lad, aged 17, who gave a remarkable history of being bitten while bathing in some running water near his native village of Horley, from which he had never been absent for more than a few days. The symptoms had first shown themselves in diarrhœa, alternating with constipation, with progressive and rapid muscular weakness and wasting, and finally with symptoms of multiple neuritis, and the skin lesions, the latter being determined by an accidental sunburn. Deep pigmentation succeeded to the erythema produced apparently by the sunburn, and the pigmented skin exfoliated, leaving shiny white surfaces. Concurrently with the improvement in the cutaneous symptoms the neuritis also got better. A second precisely similar attack occurred a month later, the neuritis and the pigmentation being more pronounced than on the first occasion. The plate was taken during this second attack. The patient was admitted into St. Mary's Hospital and kept in bed, for at this time he was completely unable to stand, and his pulse averaged 160. He was given **Digitalis** and **Strychnine**, and made a slow but apparently complete recovery, after some four months as an in-patient.

REFERENCES.—[1]*Austral. Med. Gaz.* 1913, 357 ; [2]*Pract.* 1914, i, 106 ; [3]*Brit. Jour. Derm.* 1914, 313.

PEMPHIGUS. *E. Graham Little, M.D., F.R.C.P.*

Biddle[1] describes a remarkable epidemic in a maternity and infant hospital. The eruption was mild, resembling the ordinary type of impetigo contagiosa. It yielded in due course to local treatment, and there was no mortality, notwithstanding that in several instances the distribution of disease was very extensive. In a previous similar outbreak in the same institution three years ago, the deaths rose to 30 per cent. Bacterial investigation in both epidemics showed *Staphylococcus pyogenes aureus* in the majority of cases, streptococcus being found very exceptionally. The author suggests the final discarding of the confusing name pemphigus neonatorum, and the substitution of impetigo contagiosa bullosa neonatorum. The treatment recommended is complete **Isolation** of the patient, extreme care in nursing and feeding, and the continuous local application of **Black Wash.**

Custance[2] describes a case of acute pemphigus in a stoker, age

19, demonstrated to be due to a diplococcus found in the blood and sputum, and described as a "capsulated Gram-negative diplococcus resembling the gonococcus in shape, but almost twice its size." A **Vaccine** was made from this organism, and administered in doses beginning with 5 millions, and pushed to 500 millions at intervals of three to six days. The improvement in a case which in its earlier stages was of the gravest prognosis, was very remarkable. A feature of additional interest, but not regarded as affecting the causation, was that the patient was a congenital syphilitic, and gave a positive Wassermann.

REFERENCES.—[1]*Jour. Cutan. Dis.* 1914, 268; [2]*Pract.* 1913, ii, 713.

PENIS, SURGICAL DISEASES OF. *F. W. Goyder, F.R.C.S.*

Penis Duplex.—Lionti[1] describes a case of this very rare condition, and the operative treatment employed. There was duplication of the distal portion of the penile portion. In addition to a normally formed penis, there was a smaller separate glans and body, which latter ran alongside the main one, and became fused with it under the pubic arch. There was a common prepuce. The smaller penis had a patent meatus and a urethra 10 cm. in length, which did not communicate with either the bladder or the main urethra, which was normal. A circular incision was made in the prepuce of the accessory glans, and the second penis separated by dividing bands uniting it to the main organ. It was transfixed, tied off, and removed at its junction with the main penis. The cosmetic result was excellent. Lionti claims that his is the first operation performed for this condition.

Dreyer[2] discusses the treatment of *induratio penis plastica*. The results hitherto have been very disappointing, the induration rarely disappearing sufficiently to allow of painless intercourse. He describes the case of a man, age 37, with angulation of the penis during erection, and complete impotence, of nine months' standing, due to incomplete erection of the anterior portion of both corpora cavernosa. Energetic local treatment and injections of fibrolysin were without effect. A hard nodule was present about the middle of the penile portion in both corpora cavernosa. Three months' treatment by **Radium** resulted in diminution of the size of the nodules, but the functional difficulty remained. A second series of exposures to radium, in which for two months a stronger dose was given, producing some reaction, resulted in practically complete absorption of the nodules and a return of potency. He returned two months later, having acquired syphilis, and with some consequent return of the induration. Dryer concludes that radium rays form the only certain treatment for the condition, although other observers have reported similar results from *x* rays.

Wolbarst,[3] advocating *universal circumcision* as a sanitary measure, says: (1) It is a great aid to cleanliness of the genitals; (2) It is a decided prophylactic against syphilis and chancroid. Of 800 patients, half of whom were circumcised and half not, the circumcised showed

an incidence of 22 per cent of these diseases as contrasted with an incidence of 41 per cent among the uncircumcised. He quotes eighteen other authorities in support of this view. (3) It prevents in great measure the development of venereal warts, herpes, epithelioma, and other growths. He quotes Barney to the effect that of 100 unselected cases of penile epithelioma, 85 per cent had phimosis. (4) It offers a diminished tendency to masturbation, nocturnal pollutions, convulsions, and other nervous results of local irritation. Baker reported epileptiform convulsions in a boy, age 5, cured by circumcision. Gowers reported fits in a boy, age 13, completely and permanently cured by circumcision. He advises it also in all cases of epilepsy associated with masturbation ; (5) It diminishes local complications in the presence of venereal disease ; (6) It acts as a prophylactic against balanitis. A tight prepuce which excludes the air, favours infection by an anaerobic vibrio and a spirochæte. These organisms may cause deep and widespread gangrene. It is impossible for balanitis to exist in a person who has been circumcised ; (7) It acts also as a prophylactic against phimosis and paraphimosis. Fully 12 per cent of all infants have congenital phimosis. In elderly men, too, the prepuce undergoes involution with the rest of the genital organs, and retraction becomes more and more difficult. Irritation and self-abuse are frequent results, and preputial calculi are liable to occur. Phimosis often leads to the lack of proper development of the sexual parts ; if in these cases circumcision is done, the organ will often take on a startlingly sudden growth. The bad results of circumcision are attributable not to the operation but to its faulty technique ; hence Wolbarst strongly advises its performance in all cases.

Kellock,[4] on the other hand, believes that the prepuce is the natural covering of the glans penis, protects it from irritation or injury, and preserves the sensory faculties. Denuded of this covering the epithelium becomes hard and less sensitive, and although procreative power does not seem to be lessened, he thinks it certain that the natural desire is modified and ceases at an earlier age than in the uncircumcised. Difficulty in micturition is often caused by a partial blocking of the urinary meatus by preputial adhesions immediately around it. If the closeness of the adhesion partially blocks the meatus, separation immediately around will cure the dysuria. A small pin-hole orifice to the urethra is a much commoner cause of dysuria. If the prepuce is very adherent and not unduly long, all that is necessary is a small incision on the dorsum, and one suture to allow of quite easy retraction. Under the same conditions, when inflammation or suppuration occur under the prepuce, the same treatment, i.e. an incision ¼ in. on the dorsum, is all that is required.

If, however, in addition, the prepuce is unduly long, Kellock advises the removal of only that portion that is redundant. After separating any adhesions around the meatus, that part of the prepuce projecting beyond the tip of the glans is cut off in a slightly slanting direction

parallel with the line of the corona ; both the skin and mucous membrane are cut off at the same level, and no more of the latter than of the former is removed. Then a small incision about $\frac{1}{8}$ in. long, including both skin and mucous membrane, is made on the dorsum,

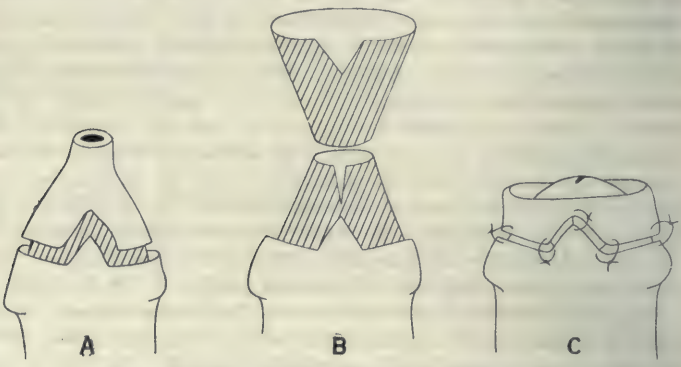


Fig. 83.—Löewe's Operation of Partial Circumcision.

A, Preliminary incision through outer leaf only, leaving a dorsal triangular flap.
B, Distal portion inverted and cut off. Slit on dorsum of remaining mucous membrane.
C, Suture line on outer surface of reconstructed prepuce.

which converts the round into a slightly pear-shaped opening. In quite young babies this is all that is needed ; in older children a few sutures may be put in. A dressing is unnecessary. The prepuce should be retracted once a day for a week or so.

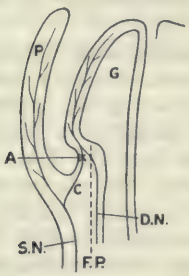


Fig. 84.—Saissi's Method for Local Anæsthesia.

A, Point of injection ; P, Prepuce ; G, Glans ; S N, Superficial nerves ; D N, Deep nerves ; F P, Fascia penis (dotted line) ; C, Communicating branch between superficial and deep nerves.

Löewe[5] also believes that complete removal of the prepuce is inadvisable. He makes an incomplete circular cut through the outer 'leaf' only of the prepuce about the level of the middle of the glans, leaving a three-cornered flap pointing distally on the dorsal side. The width of this must be broader or narrower according to the extent of the phimosis. The inner portion is then cut off circularly about the level of the tip of the glans, a short slit made dorsally to accommodate the V of the outer portion, and sutures applied to keep the cut edges in apposition. Sufficient of the prepuce should be left to cover the glans or nearly so, and the suture line lies on the outer surface of the reconstructed prepuce (*Fig.* 83).

Saissi[6] obtains perfect local anæsthesia for circumcision by infiltration of the prepuce in the ordinary manner, followed by careful injection behind the corona at the point where the deep nerves of the glans pierce the fascia of penis and become superficial and

PLATE XLVI.

X-RAY DIAGNOSIS OF PNEUMOPERICARDIUM

Illustration kindly lent by Dr. Gibson and the Delegates of the Clarendon Press

communicate with the superficial nerves of the prepuce. Unless this latter series of injection is adequately done, anæsthesia will be imperfect (*Fig.* 84).

REFERENCES.—[1]*Deut. med. Woch.* 1914, Feb. 393 ; [2]*Ibid.* 1913, Sept. 1884 ; [3]*Jour. Amer. Med. Assoc.* 1914, Jan. 92 ; [4]*Med. Press and Circ.* 1913, ii, 669 ; [5]*Münch. med. Woch.* 1914, May, 1119 ; [6]*Presse Méd.* 1914, 254.

PERICARDITIS. *Carey Coombs, M.D., M.R.C.P.*

Graham Steell[1] recounts a number of cases in which the development of a friction rub accompanied and followed an attack of angina pectoris. He attributes the former to nutritional disturbances in the cardiac wall, set up during the anginal attack, and influencing the smoothness of the pericardial surfaces without actually exciting inflammatory exudation. [In one example of this association seen by the writer, the patient died within forty-eight hours of spontaneous rupture of the ventricular wall.—C. C.]

Mackintosh[2] describes a case of acute rheumatic pericarditis in which **Salicylic Ionization** was practised, relief of pain being secured at once. The medicated pad was applied to the precordium. The patient was a thin subject. Salicylate was given by the mouth also.

Pericardial Adhesion.—Smith's[3] study of this subject was based on a series of sixty-two cases in which post-mortem examination discovered pericardial adhesions. Like other investigators, he finds two groups of cases : those in which the clinical picture was that of cardiac disease, and those in which none of the symptoms or signs called attention to the heart. A large proportion of the former group are young patients with rheumatic heart disease of which the pericardial lesion is but one phase. In such cases the existence of pericardial adhesion may be suspected, but not certainly diagnosed, " when the cardiac failure is more marked or the cardiac enlargement more extensive than the endocardial damage seems to warrant."

Pneumopericardium.—Cowan, Harrington, and Riddell[4] describe a case and analyze 48 reports from the literature. In the majority, but not in all, there is an obvious communication between the pericardial sac and some viscus (œsophagus, stomach, lung), or the exterior of the chest through a wound. The onset may be gradual and like that of acute pericarditis ; or sudden, with cyanosis, pain, and collapse. The physical signs are distinct. The apex beat disappears, and the cardiac dullness is replaced by a tympanitic note, the area of which shrinks as effusion collects within the sac. So soon as this has developed, characteristic rhythmic splashing sounds are heard over the precordium. Of the 43 cases, 15 recovered ; among the fatal cases were many in whom the primary lesion was mortal. The treatment necessarily varies with the cause. These writers lay special stress on the value of radiography in diagnosis. In their case the outline of the distended sac was clearly visible, the heart lying free within it (*Plate. XLVI*).

REFERENCES.—[1]*Med. Chron.* 1914, Apr. 503 ; [2]*Brit. Med. Jour.* 1913, ii, 1205 ; [3]*Jour. Amer. Med. Assoc.* 1913, ii, 739 ; [4]*Quart. Jour. Med.* 1914, Jan. 165.

PERINEUM, RUPTURE OF *Bryden Glendining, M.S., F.R.C.S.*

Dickinson[1] describes his methods of treating the freshly ruptured perineum following labour. If the tear is at all extensive, the suturing is postponed for twenty-four to forty-eight hours. He is of opinion that the best results are obtained by using a continuous suture which laces and carefully coapts all portions of the loin surfaces, finishing up with complete apposition of the vaginal and skin edges, so that no lochial secretion enters the wound. Under this treatment, in fifty-seven cases there was no instance of the wound breaking down, and the resulting scar was negligible.

Ellise MacDonald[2] has had prepared a rubber stamp which he uses as a chart of the perineum, and records the position and extent of lacerations in each case. In looking over the past cases so charted, he notes that in 32 out of 48 the lesions involved the anterior portions of the vulva and vagina, and in some instances gave rise to serious hæmorrhage ; he corroborates, too, the general finding that a laceration of the perineum is only exceptionally central. As a preventive, stretching of the perineum is advised before applying forceps. The shoulders seldom originate a laceration, but large shoulders quite frequently increase the extent of a laceration originated by the head.

Jellett,[3] in a paper read before the Congress of American Surgeons, lays great stress upon the importance of the levator ani in all operations having for their aim the reconstitution of the perineum. He dwells at some length upon the anatomy of the muscle, criticizing Krönig's inconsistent statements concerning it. In the operation as practised by Jellett there is first of all reflection of the vaginal flap as is common to the generality of perineorrhaphies, and secondly, in the triangular space so exposed, the picking out of the levator ani muscle with forceps and making their edges meet in the middle line. This latter is described as an easy matter, but many have experienced difficulty in identifying the muscle. The author, after sewing the vaginal edges together, finishes by using deeply-passed silkworm gut sutures, which, besides coapting skin, also bring together perineal muscles as well as levator ani, so that in fact these stitches coapt the whole mass of the perineum. The author concludes that the operation is effective and finished in fifteen minutes, and routine suture of the levator ani is always practicable except when the muscle is wanting, owing to atrophy incident upon injury.

References.—[1]*N. Y. Med. Jour.* 1914, ii, 157 ; [2]*Amer. Med.* 1913, 733 ; [3]*Lancet*, 1914, ii, 315.

PERITONEAL ADHESIONS. *E. Wyllys Andrews, M.D. (Chicago).*

Payr[1] discusses the prophylaxis of peritoneal adhesions, based on experience with 150 operations for post-operative and spontaneous adhesions. He advocates the avoidance of unnecessary drainage and the careful disposition of the coils of the viscera, to avoid lying in false relations. The use of emulsions and mixtures containing **Metallic Iron** taken internally, combined with the application of a

powerful **Magnet** over the abdomen, in the post-operative management, has been tested experimentally on animals. The magnet seems to have the power of drawing the intestine containing the iron mixture, freely about the abdomen. The apparatus is shown in *Fig.* 85.

For the same purpose, Jelke[2] suggests the intraperitoneal use of **Collargol** in diffuse suppurative peritonitis. Two cases are reported, in which it seems to have had almost an abortive influence in checking peritonitis and preventing adhesions.

Burrows[3] has practised the intra-abdominal use of **Oil** as a preventive of post-operative adhesions. A bland, non-toxic, sterile oil can be poured into the cavity after operations; and, in his experience,

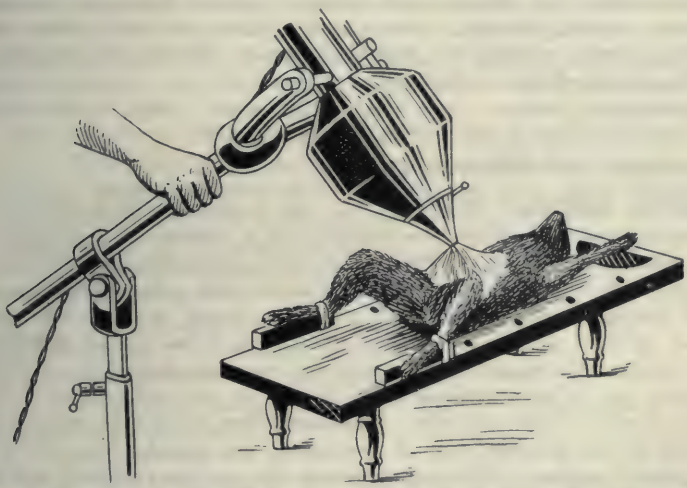


Fig. 85.—Prophylaxis of peritoneal adhesions. Large intestine injected with preparation of iron, showing the electro-magnet acting through the abdominal wall.

has given good results. On the other hand, his experiments showed that iodine, mercuric chloride solution, and other antiseptics applied to the peritoneum, increased adhesions and rapidly spread beyond the area intended, so that they should be used with great caution on peritoneal surfaces. Also, olive oil containing fatty acids, and commercial liquid petroleum containing impurities, and other animal and vegetable oils, caused inflammation by contact with the peritoneum, and were a source of danger. Bland and non-irritating oil, represented by purified liquid petrolatum, obtained from Russian oil, causes none of the changes above mentioned, and does prevent adhesions. This oil, therefore, used intra-abdominally, in sufficient quantities, does prevent to a great extent the formation of post-operative adhesions. Oil also fills the lymphatic channels leading from spaces denuded of peritoneum, and thus checks septic absorption.

Pope[4] made experimental studies in the prevention of peritoneal adhesions by the use of **Citrate** solutions. Starting from the fact that thrombin as an active enzyme converts soluble fibrinogen into fibrin, we might influence the production of fibrin deposits on peritoneal surfaces in the abdominal cavity; but we must either inactivate thrombokinase, or bind the calcium in the serous exudate. In the Research Department of the University of California, sixty experiments were performed on rabbits under narcosis. In general, it was found that the extent of adhesions was proportionate to the trauma of the peritoneum, and that the storm of irritation was over in forty-eight hours. Citrate of soda introduced into these animals, to a large extent prevented plastic exudate by its inhibitory action. Tested intravenously, the citrates and oxalates seemed to have no toxic influence on the animals. It is conceded that the best medium for carrying citrate solution has not been found. Further investigations are being carried out to this end.

REFERENCES.—[1]*Münch. med. Woch.* 1913, 2601; [2]*Ibid.* 1828; [3]*Med. Press and Circ.* 1913, ii, 498; [4]*Ann. Surg.* 1914, i, 101.

PERTUSSIS.—(*See* WHOOPING-COUGH.)

PHARYNX, DISEASES OF. *J. S. Fraser, M.B., F.R.C.S.*

Streptococcal Sore Throat.—Capps[1] gives a review of epidemics of this affection in Boston, Baltimore, and Chicago, in which over twelve thousand people were affected. In all three cities a hæmolytic capsulated streptococcus was secured from the throat or from the peritoneal exudate of fatal cases, and the infection was traced definitely to a single milk supply. The epidemic was attributed to mastitis in cows, or to streptococcal sore throat in the milkers or other employés who handle the milk. **Pasteurization** of the milk is strongly advised as the simplest way of preventing the malady.

Vincent's Angina.—Rolleston[2] records the case of a patient, age 20, who had a deposit on the right tonsil, from which Vincent's organisms were obtained. Next day the tonsil was ulcerated, and various local measures were subsequently tried, including methylene blue, potassium chlorate, and iodine. A fortnight later, as the condition still resisted treatment, a throat swab, moistened with glycerin, was dipped in **Salvarsan** powder and rubbed over the affected area. This treatment was repeated on four occasions, and in twelve days the throat was quite normal.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1913, Sept. 16; [2]*Proc. Roy. Soc. Med.*, Clin. Sect. Nov. 1913,

PHTHISIS. (*See* TUBERCULOSIS, PULMONARY.)

PHYLACOGENS. (*See* GONORRHŒA.)

PITUITARY GLAND, DISEASES OF. *Herbert French, M.D., F.R.C.P.*

Since Marie first directed attention in 1886 to the pituitary gland as a factor in disease, it has been subjected to much scrutiny, and there is some danger of its becoming overworked as a *causa morbi.*

Nevertheless, the association of destructive and atrophic lesions of the hypophysis with clinical manifestations, is close. The dependence of dystrophia adiposogenitalis—*typus Froehlich*—upon hypopituitarism may be considered as proved. This form, which is characterized by defective development of secondary sexual characteristics, atrophic genitalia, hypotrichosis, and adiposity, has its prototype in animal experimentation.

The case is different in acromegaly. Although circumstantial evidence for a hyperpituitarism or perverted secretion of the pars anterior as its cause is almost conclusive, yet it is not absolute. It is much the same with gigantism, and as a working hypothesis one must accept the dictum of Launois and Roy that gigantism is acromegaly in subjects whose epiphysial cartilages are not ossified, no matter what the age. The sequence of hypophysial struma and disturbed sexual or skeletal development is not invariable, but it is close, and there is also a relationship of the pituitary gland to diabetes mellitus and diabetes insipidus.

Dunn[1] gives the following nosological schema which serves to sketch the conditions resulting from the failure of the pituitary gland to discharge its particular functions in the interlocking glandular directorate which controls metabolism, growth, and sexual life :—

1. Affections of the pars anterior :
   - (*a*) Hyperfunction—acromegaly, gigantism
   - (*b*) Hypofunction—true or pituitary dwarfism (not chondrodystrophic, rachitic, or cretinic dwarfs).
2. Affections of the pars posterior :
   - (*a*) Hyperfunction—diabetes insipidus
   - (*b*) Hypofunction—hypophysial obesity (dystrophia adiposogenitalis).
3. Mixed affections :
   - (*a*) Hyperfunction of the pars anterior with hypofunction of the pars posterior—acromegaly with hypophysial obesity
   - (*b*) Hypofunction of both lobes—dwarfism with hypophysial obesity.
4. Hypophysial disturbance, in conjunction with perverted activity of other glands :
   - (*a*) Ovarian or testicular hypofunction with—
     - Hyperfunction of pars anterior—acromegaly with sexual impotence—eunuchoid giants
     - Hypofunction of the pars anterior—pituitary dwarfism with sexual impotence
     - Hypofunction of pars posterior—dystrophia adiposogenitalis—genital obesity.
   - (*b*) Associated with disturbances in the functions of other ductless glands, i.e., adrenals, pancreas, thyroid, pineal gland, thymus (status thymolymphaticus), etc.

He also lays much stress upon the value of good radiographic plates in detecting changes in the shape and size of the sella turcica as a

means of diagnosing pituitary-gland affections. He describes the following types of abnormal conditions seen :—

1. Intrasellar growths widen and deepen the sella so that its floor approaches that of the middle fossa. The dorsum ephippii is thinned out, pushed backward, tipped backward, and elongated. Often the posterior clinoid processes partake of the general osseous overgrowth in acromegalics. Changes elsewhere in the skull are often demonstrable—namely, prognathism, large sphenoidal, frontal, and superior maxillary sinuses, thickened skulls, widened sphenoparietal sinuses, digital impressions, and broad sutures with excessive suture indentations.

2. Extrasellar growths tend to produce dishing. The cantel is widened, thinned, and shortened ; the floor maintains its normal relation to the base of the skull ; acromegalic changes, as a rule, are absent, and there is thinning rather than thickening of the skull.

3. Large hypophysis tumours may give rise to complete destruction of the sella, often invade the sphenoidal sinuses, and may rarely destroy the body of the sphenoid completely. Their extra- or intrasellar origin often cannot be determined at this stage. The anterior clinoid processes may point to their origin, i.e., they are often pushed upward and elongated in cases of intrasellar growths, while they are shortened in cases of extrasellar growths.

4. Processes which give rise to increased intracranial pressure will frequently produce changes in the sella. They are more inclined to affect it asymmetrically ; occasionally basal tumours will distort the sella in such a manner that röntgenological differentiation is impossible. Tumours arising in the sphenoid itself may even destroy the surrounding structures and leave the sella more or less intact.

The value of good plates in obscure disorders of growth and of sexual development and activity, and in cases with symptoms pointing to intracranial mischief, can hardly be over-estimated. Disturbances of vision, migraine, epileptic attacks, psychical anomalies, trophic disorders—such as obesity, infantilism, impotence, gigantism, dwarfism, menstrual disturbances without pelvic explanation—should call for an *x*-ray examination. Dunn has watched the development of pituitary disorder in two epileptics in whom the plates showed sellar deformation.

Johnson[2] records the histological appearances found in four cases of gross pituitary tumour ; and Fearnsides[3] has collected twelve fresh cases of pituitary disease, three of which were examples of acromegaly ; three of dystrophia adiposogenitalis ; one of infantilism and optic atrophy ; one of primary optic atrophy and glycosuria ; one of optic atrophy without any sign of disturbance in general metabolism ; one of hydrocephalus, spastic paraplegia, and ataxia of the legs, with subpituitarism ; and two of the ' pudding-face ' type of dyspituitarism. Like Dunn, he lays particular stress upon the need for good *x*-ray plates of the sella turcica in confirming the diagnosis.

Anders and Jameson[4] have collected twenty-eight cases in which

glycosuria appears to have been due to disease of the pituitary gland ; in some of these, but not in the majority, there was some degree of acromegaly. The closeness of the inter-relationship between the various ductless glands is brought out by the fact that amongst their cases are some in which acromegaly, glycosuria, and exophthalmic goitre were all present in the same patient.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1914, ii, 214 ; [2]*Lancet*, 1914, ii, 24 ; [3]*Ibid.* 16 ; [4]*Amer. Jour. Med. Sci.* 1914, ii, 323.

PITYRIASIS ROSEA. *E. Graham Little, M.D., F.R.C.P.*

In a discussion on the nature and causation of this disease, inaugurated by a paper by Graham Little, at the Royal Society of Medicine, some interesting contributions were made.[1] In a series of 174 personal observations, Little found it nearly equally divided between the sexes, thus contradicting the usual statement that it is twice as common in females as in males. Seasonal variations have constantly been reported as affecting the incidence of the disease ; but there is no agreement as to which season favours its development. This author described from his experience a curious prevalence in July, October, and December, in which months the frequency rose to nearly double the average for other periods. The incidence of age showed its highest curve between the years five and fifteen, nearly half of all the cases occurring under the latter age. Recurrence of eruption is extremely uncommon. Some instances of this were mentioned in the subsequent discussion, and Little has more recently reported a well-established case in which he saw both periods of eruption.

Opinions were much divided as to the effect of treatment, which many observers regard as of no avail in shortening the duration of the rash, although all were agreed that symptoms, such as severe itching, constipation, or anæmia, should be treated. The importance of the recognition of this disease, and the infrequency of this recognition by the general practitioner, were commented on by several speakers, and there was general agreement that the disease was increasing in frequency. The following is a summary of the different views held as to its causation : (1) The disease has been ascribed to a parasite, identified with the parasites causing ringworm, by Hebra, Kaposi, and some later members of the Viennese school. This view may be regarded as obsolete. (2) The disease is ascribed to an unidentified parasite, cryptogamic in nature (Vidal, Du Bois, Covisa). Nékam has found Du Bois's parasite, but reserves judgement as to its pathogenicity. (3) The disease is regarded as being of the nature of a specific exanthem, with a special incubation period, a period of evolution, and a period of decline. It is a disease *sui generis*, with its nearest analogies among the specific fevers (Moingeard, Thibierge, and others). (4) The disease is not *sui generis*, but is a stage (' fait de passage ') between a number of inflammatory scaly diseases, such as psoriasis, pityriasis rubra pilaris, and psoriasiform parakeratosis (Brocq, Darier). (5) The disease is the cutaneous reaction to a

toxæmic absorption, and may be associated with gastric dilatation, intestinal disorders (Jacquet, Feulard, etc.), indicanuria and peptonuria (Fiocco), the puerperal state (Sherwell). (6) The disease is caused by irritants, such as damp, ill-ventilated garments (Lassar, Kromayer, Hutchinson).

REFERENCE.—[1]*Proc. Roy. Soc. Med.* (*Dermat Sect.*) Mar. 1914.

PLAGUE. *Sir Leonard Rogers, M.D., F.R.C.P.*

The eighth Report of Plague Investigations in India[1] contains a series of papers, all on work done at the Lister Institute in London. S. Roland has continued his work on the plague bacillus, and investigated the influence of cultivating the organism in serum-containing media. He found that if the serum had been previously heated to 55° C. for half an hour, the virulence was greatly increased, and broth-grown vaccines failed to afford adequate protection against the strain. On the other hand, when grown in unheated serum, the virulence was reduced. Further, the extract from a race grown in serum provided a much more satisfactory immunizing agent against a serum race of organisms than one prepared from broth-grown bacteria, and approached the efficiency of a living culture, such as Strong has employed. In a second paper he shows that the serum of a normal rat has a greater depressing action on broth-propagated organisms than it has on bacilli direct from the body of infected animals. In a third paper he describes and illustrates the great variations in the morphology of the plague bacillus under different conditions, including forms simulating micrococci, streptococci, bacteria, streptothriciæ, and even mould fungi. R. St. John Brooks has investigated the influence of the medium in which the plague bacillus is grown on the facility with which it is ingested by human phagocytes, and found that its growth in serum did not exert any influence, thus—in view of Roland's work above mentioned—indicating that the power to infect is dependent on other factors than the resistance to phagocytosis.

A. W. Bacot and C. J. Martin contribute an interesting paper on the mechanism of the transmission of plague by fleas, in which they show that two species of rat-fleas can transmit plague in the act of sucking blood under conditions precluding the possibility of infection by dejecta. In a certain proportion of infected fleas the bacilli multiply to such an extent as to occlude the alimentary canal at the entrance to the stomach, and extend into the œsophagus. When such a flea attempts to suck blood it distends the infected œsophagus, and some of it is forced back into the wound, which is very dangerous. In this condition they cannot stand drying up in a hot atmosphere, and this may explain the limitation of epidemic plague to the cooler and moister seasons in India.

The remainder of this volume is taken up by an elaborate study by Bacot on the bionomics of rat-fleas, showing that bacteria do not survive in larval fleas during the pupal stage. In another, on the effect of various vapours of insecticides upon fleas and on the larval

stage of the bed-bug, he says that for killing adult fleas and bugs a liquid, such as crude phenol or petroleum made into an emulsion with soap, is most effective. The vapours of both phenol and lysol are also effective. For killing fleas in all stages, naphthalene, either melted by heat or as a solution in benzene, poured into cracks or corners, is the best thing to use. For use in rat-holes, soap-carbolic or petroleum emulsion duly watered down, might be used, with the addition of flake naphthalene.

F. A. Foy[2] deals with the destruction of rats in the Port of Rangoon as a plague-preventive measure, as is insisted on in the case of vessels going to certain ports. The three methods used are: (1) Compressed sulphurous acid in gas in cylinders; (2) Sulphur burnt in the holds; and (3) By Clayton's apparatus, the last being the most effective plan.

A. Castellani and M. Philip[3] report the outbreak of plague at Colombo in the septicæmic form, which was overlooked for a time. No rat infection was noted before the human cases began, and the source of the infection was not discovered. The infected rats so far also had the septicæmic form of plague.

O. Schobl[4] reports some bacteriological observations on plague in Manila. Three cases with plague bacilli in their blood recovered under **Serum** treatment. The agglutination test was of no diagnostic value. His results supported the rat-flea theory of infection, and he found a cat infected with plague. V. G. Heiser[5] deals with the reappearance of plague in the Philippines after an interval of six years. Systematic measures of rat destruction, disinfection, and insecticidal measures were effective in preventing a second case of plague occurring in any house after the incubation period had expired. Rats were killed by traps, of which spring ones were the cheapest and most effective; poisoned bait; clubbing and terrier dogs, beginning from the periphery three blocks around the infected house.

S. Kitasato[6] gives an account of our present knowledge of plague. Observations at Kobé in 1909–10 confirmed the flea theory. Decoy guinea-pigs were very important in detecting infected rat-fleas.

Row[7] records 87 cases of plague treated with **Vaccines**. All of 43 septicæmic cases died, while the 44 non-septicæmic cases all recovered.

Early intravenous injection of **Electrargol** seems to reduce mortality in the bubonic form (*p.* 13).

References.—[1]*Jour. Hyg.* 1914, 401; [2]*Brit. Med. Jour.* 1913, ii, 439; [3]*Ibid.* 1914, i, 752; [4]*Phil. Jour. Med.* 1913, 409; [5]*Ibid.* 1914, 5; [6]*Berl. klin. Woch.* 1913, 1881; [7]*Brit. Med. Jour.* 1913, ii, 1021.

PLEURAL EFFUSION. (*See also* Thorax, Surgery of.)

O. C. Gruner, M.D.

Evidence of Tuberculous Origin of Pleural Effusion.—Gloyne[1] advises the estimation of the amount of uncoagulable protein as being the best index to the nature of a fluid, whether tuberculous, simple, or malignant. The fluid is heated on a water-bath with a few drops of dilute acetic acid, filtered, and washed with boiling distilled water,

followed by alcohol and ether. The precipitate is dried and weighed. This observer treats the clot of an inflammatory exudate with 20 per cent antiformin for an hour at 37° C. The preparation is then made and stained with Romanowsky. A high percentage of lymphocytes speaks for tuberculosis, though it does not obtain in very early cases, in some cases of pneumothorax, or in cases with secondary infections.

REFERENCE.—[1]*Lancet*, 1913, ii, 1534.

PLEURISY. (*See also* EMPYEMA ; THORAX, SURGERY OF).

J. J. Perkins, M.B., F.R.C.P.

Mace[1] calls attention to the close imitation of gastric symptoms which may be occasioned by chronic pleurisy. The painful simulation of acute abdominal disease by acute lesions within the thorax has long been known, but the source of error which Mace has observed refers rather to the imitation of chronic gastric trouble or even gastric ulcer, and occurs in the course of chronic lung disease. The symptoms met with are pain passing through to the back, where a tender spot can often be found on the right, the pain being relieved by the taking of food or alkalies, or by vomiting, which with abundant flatulence, is a constant feature. The patients whom he met with had mostly suffered from these symptoms for years, and had sought relief without avail in prolonged courses of treatment or even in operation. Careful examination sometimes showed the stomach distended with gas, but there was no occult blood in the stools, and neither an analysis of the contents nor an *x*-ray examination showed any abnormality of the stomach. In all the observed cases, however, the *x* rays revealed marked changes in the thorax, often signs of pulmonary infiltration ; but especially and invariably, retraction and fixation of the diaphragm on the right side.

Under suitable treatment directed to the lung condition, great if not complete relief of the gastric symptoms was obtained, and the author is inclined to view the production as mechanical, the diaphragmatic adhesions being pulled upon, with the result that pain was referred along the course of the lower intercostal nerves. An example of the possibility of this causation is afforded by the case of a patient with adhesions between the base of the lung and the diaphragm, in whom the production of an artificial pneumothorax caused pain in the stomach, flatulence, and vomiting lasting for several hours.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 674.

PNEUMONIA. *J. J. Perkins, M.B., F.R.C.P.*

The *tendency of pneumonia to relapse in some children*, with the result that the cases take a course extremely suspicious of tuberculosis or empyema, is well brought out by Armstrong.[1] The form of the disease in which relapse is common is the primary pneumonia of lobular distribution. The course of events in these cases of relapse is best followed by quoting the details of a particular instance. The child was admitted to the hospital with signs of pneumonia on

apparently the fifth day of the disease. Four days later there was a fall of temperature to 96°, and the physical signs, with the exception of a few râles, disappeared. The same evening, however, a severe relapse occurred, and a very considerable area of fresh lung tissue was involved on both sides. So alarming became the child's condition in the fourth week of illness that the chest was explored, but no fluid was obtained. The temperature continued irregularly raised, fresh areas of consolidation appearing as others resolved. During the next two months at least eight distinct relapses, each associated with fresh physical signs, occurred. The child gradually became much weaker, and the spleen was felt to be greatly enlarged; in spite of which, thirteen weeks after the onset of the fever, the temperature fell and remained subnormal, the child rapidly improved, and all the physical signs in the chest disappeared. Recovery was finally complete. Three other similar cases are reported, running long courses but all ending in complete recovery. The physical signs in some instances strongly suggested the presence of fluid, and as at the same time the child was losing weight and was seriously ill, pus was sought, but none found. In other instances, the child assumed the strumous appearance of chronic tuberculosis, but von Pirquet's test gave only negative results. The temperature at times oscillated widely in these cases, there being a difference of five or six degrees between the morning and evening readings, while the relapses were separated by intervals of normal temperature lasting as long as ten days. In two of the cases, the pneumococcus was proved to be the cause of the disease, while in the remaining two there was little or no doubt that this organism was at work. Vaccine treatment was tried in one case, but without much evidence of beneficial effect. The treatment adopted was of a general supporting type, while brandy proved a most valuable means of tiding over the stress of the later relapses. As stated above, the resolution of the lungs was complete in each case, and no evidence of fibrosis, bronchiectasis, or secondary infection by the tubercle bacillus ever occurred.

Pneumonia due to the *B. Friedländer* is marked, according to Michell Clarke,[2] by certain peculiarities. In the acute cases, which compared with pneumococcal infection are small in number, the sputum is abundant and yellowish-green in colour, the temperature shows irregular oscillations, and the physical signs are those of an aggregation of lobular patches rather than of true lobar consolidation. There is a pronounced tendency to the occurrence of softening, and in two of his cases he found it almost impossible to decide whether the condition was due to the organism under discussion or to a chronic tuberculosis with secondary infection. The situation and character of the lesions, which were apical and cavernous, pointed to tuberculous infection, but repeated examinations failed to reveal the presence of the tubercle bacillus, while *B. Friedländer* was present, in one case in pure culture. As far as the history could be relied on, the lesions were of recent date; the expectoration was abundant, while irregular

fever and night sweats were present at the start, though later the course was apyrexial. Treatment by **Vaccine** was employed, but it is difficult to say with what effect. The cough was much improved and the expectoration diminished, but the physical signs showed little change, and the bacillus was apparently not eliminated from the sputum. In two of the other reported cases the same bacillus was found, probably as a secondary infection, bronchiectasis being present in one instance, while in the second the symptoms followed the aspiration of a chicken bone. Treatment by vaccine was naturally ineffective in the last named, but in the case of bronchiectasis, considerable relief as regards the quality and quantity of expectoration, undoubtedly followed.

Wynn[3] reports excellent results from the treatment of pneumonia in its earliest stages with a **Vaccine.** In a few cases he has been fortunate enough to be able to use a vaccine within twenty-four hours, and in one case even within eight hours, of the initial rigor, and in these cases there has been a satisfactory response, the temperature falling to normal on the second or third day, a moderate rise following, with a final fall to normal after a second dose of vaccine. In the case seen and treated within eight hours there was no further rise above 99·8°. Such early treatment of course necessitates the use of a stock vaccine ; owing to differences in strain, this vaccine should be polyvalent, and Wynn has not seen grounds for believing that such a vaccine compares disadvantageously with an autogenous vaccine except in cases of mixed infection. He attributes the unsuccessful results so often obtained with vaccine treatment not only to delay but to the use of inadequate doses. Doses of 5 to 10 million, according to him, are quite useless, and his own doses have ranged from 25 to 50 million. With increasing experience he leans to the larger dose, though even this he feels may be too small. In this he is confirmed by the results of Sir Almroth Wright,[4] who found that small doses frequently repeated were quite ineffective, while a single large dose administered in the incubation period often arrested the disease. Wynn has seen no signs of a negative reaction after the larger doses.

Rosenow[5] has shown that when virulent pneumococci are suspended in physiological salt solution, the substances on which their resistance to phagocytosis and virulence depend, pass into solution. The soluble toxic parts have little immunizing action, and have been found actually to interfere with the formation of antibodies, while the insoluble constituents have well-marked antigenic properties. Proceeding on these lines, he has attempted the treatment of pneumonia with vaccines prepared from such detoxicated pneumococci. His most striking evidence is from a large group obtained by treating in this way, without selection, every second case admitted to the Cook County Hospital, Chicago, during January, February, and March of 1911, 1912, and 1913, the height of each pneumonia season, the alternate uninjected cases serving as controls. Altogether 146 cases were injected, the controls numbering 148 ; treatment,

apart from the vaccine, was the same for both groups. Of the uninjected controls, 56 died, a death-rate of 47·8 per cent; of the injected 34, a death-rate of 23·3 per cent only. The high death-rate among the controls he explains by the fact that the mortality from pneumonia in this hospital is always very high, most of their cases coming from the least favourable classes, and many of them being alcoholic. The ages of the two groups were practically identical, whether of the whole series or of those who died. Among the uninjected were 72 bad alcoholics, of whom 20 died; among the injected 73, of whom 26 died.

The average time of the first injection was the fifth day of the disease, an unavoidable disadvantage, and he noted that the earlier the injection the more marked the tendency to an early crisis. In all but two of twenty-one cases, in which crisis occurred on the sixth day or earlier, the injections were begun on the first or second day.

Roper[6] quotes Weitz as having obtained excellent results in the treatment of thirty-seven cases by the use of **Polyvalent Serum** prepared as advised by Neufeld and Händel, 10 to 40 cc. being injected intravenously, some patients receiving one dose and others two or more at one-half-, one-, or two-day intervals. The results, especially in the septicæmic cases, were strikingly good. Cole divides pneumonias into four groups: (1) Due to organisms causing almost 50 per cent of pneumonias, and capable of producing an immune serum; (2) The organisms in this group cause a smaller number of cases of a more severe type, and are capable of producing a serum specific for the group; (3) Due to the *Streptococcus mucosus*; (4) Including all organisms not agglutinated by sera specific for (1) or (2). It is evident from this, how essential it is to identify the organism causing pneumonia and to use the specific serum, and Roper advises confining the use of serum for the present to typical cases until its value in those has been established.

The Neufeld-Händel serum proved, however, inefficacious in the hands of Reuss,[7] who found himself quite unable to confirm the good results of previous writers. The cases treated comprised 28 of croupous pneumonia and 4 of pneumococcal septicæmia. The serum was given intravenously in every case but one, 20 c.c. being the usual dose, while 40 c.c. and 60 c.c. were occasionally employed. One patient received three injections, six two, and the rest one only. General treatment was employed as usual. With the smaller doses no unfavourable symptoms were noted; but on one occasion, with the larger dose, symptoms of shock and cardiac weakness developed. The injections were given as soon as possible after diagnosis of the disease, nine of the cases being treated as early as the second day. The ages of the patients were fairly distributed between seventeen and sixty. Of those who received the serum, 20 recovered, while of 30 control cases admitted to the hospital during the same period, 10 died and 20 recovered. In the previous year, when no injections were in use, 120 cases of pneumonia were admitted to the hospital,

of whom 75 recovered and 35 died, the mortality therefore being unaltered by the use of the serum : in those cases treated by serum which came to autopsy, the lung showed no change from the usual. One advantage, however, seemed to follow the use of the serum, viz., an earlier crisis, which took place between the fifth and seventh days in the majority of cases, whereas in the two previous years the crisis had occurred on an average in one year between the sixth and ninth days, in the other between the eighth and tenth days. It should be noted in extenuation of the comparative failure of the serum, that the injections were not so frequently repeated as by other observers. After the fifth day the injection seems to be useless.

The advantage of **Bleeding** combined with the injection of **Adrenalin** in normal saline is well shown by the results which followed in a desperate case of pneumonia reported by Lonhard.[8] The injection of serum, digalen, camphor, and ether had all proved ineffectual, and the condition of the patient was extremely grave. He is described as being completely unconscious and cyanotic, with tracheal râles ; pulse 140, very feeble ; respirations 58. 300 c.c. of blood were withdrawn, and at the same time 500 c.c. of normal saline with 0·5 c.c. of suprarenin (1 – 1000) were injected ; consciousness was recovered, together with a great improvement in the other symptoms. The injection was repeated next day, as the patient had relapsed, and again in the evening 700 c.c. of normal saline together with 0·6 c.c. suprarenin (1–1000) were injected, as consciousness had again been lost, and on the following day 0·5 c.c. suprarenin. The patient subsequently made an uninterrupted recovery. Lonhard attributes the excellent result partly to the stimulating effect on the heart and vasomotor system, and partly to the removal of toxins by diuresis.

The treatment of acute pneumonia by the **Open Air** method which has been very much in vogue during the last few years is a subject of investigation by several observers, as it has apparently not justified the claims of its advocates. Of 111 cases reported by Gwyn[9] treated under open-air conditions, but receiving in addition the usual means of treatment, 45 died. In some respects, however, the results were beneficial, the fever being slightly influenced to the extent of one or two degrees ; there was less cyanosis, and the rate of the respiration was decreased, while delirium seemed to be a less evident feature. No definite beneficial effects on pulse-rate or blood-pressure could be seen, or on the crisis, while complications were not forestalled. Willson[10] has come to a still more unfavourable opinion, the mortality from all types of pneumonia in three years rising to 61·5 per cent under conditions of cold outer air. In contrast with these figures, 19 cases of pneumonia were treated during the months of January and February, 1914, in his service, with as much fresh air as possible, but in the warm general wards, with a mortality of but 15·2 per cent. The fall in death-rate is the more striking in that practically all these patients had been addicted to the use of alcohol. He concludes that only such pneumonics as obtain a stimulus from cold should be treated

out-of-doors, and even these should be sent back into warmer conditions when the crisis occurs or when they appear pinched and cold from exposure.

Phosphorus recommended (*p.* 25).

References. — [1]*Brit. Jour. Child. Dis.* 1913, 444; [2]*Bristol Med.-Chir. Jour.* 1914, 1; [3]*Lancet*, 1914, i, 353; [4]*Ibid.* 87; [5]*Jour. Amer. Med. Assoc.* 1913, ii, 2203; [6]*Med. Rec.* 1914, ii, 187; [7]*Deut. med. Woch.* 1914, 1104 [8]*Ibid.* 1913, 1936; [9]*Ther. Gaz.* 1914, 79; [10]*Jour. Amer. Med. Assoc.* 1914, i, 1534.

PNEUMOTHORAX, ARTIFICIAL. (*See* Tuberculosis, Pulmonary.)

POLIOMYELITIS. (*See also* Paralytic Deformities.)

Purves Stewart, M.D., F.R.C.P.

Acute polio-encephalomyelitis is now recognized to be an infective disease due to an organic virus. Its etiology and bacteriology have been thoroughly elucidated during the past few years, notably by Flexner and his pupils in America, and by Römer, Levaditi, and others in Europe. (See Medical Annual, 1911, *pp.* 483–488.) Flexner has produced a curative **Serum** which, if administered during the early febrile days of the disease, before paralysis has supervened, may abort the malady and limit or prevent the subsequent paralysis. Most cases, however, do not come under the neurologist's observation until some time afterwards, when the paralysis is already established and the anterior cornua of the spinal cord are already damaged. In these cases, the problem before us is how to make the most of the surviving nerve cells and muscles.

During the early febrile stage of the disease, in addition to curative **Serum** hypodermically, full doses of **Hexamine** (urotropine) should be given, and the nasal passages should be douched with some antiseptic fluid. Pains in the spine and limbs are best relieved by rigid fixation of the body. Postural deformities must be prevented at the very outset by means of light splints. During the tender stage, which may last from three to eight weeks, massage and electrical treatment should be avoided. Once the tender stage is over, the gentlest form of **Massage** should be allowed, consisting of light vibratory effleurage of the skin. Deep muscle kneading will only damage fragile muscle fibres and will actually do harm. The paralyzed muscles must be placed in a position of relaxation, and must never be allowed to be stretched, even passively, since in a stretched muscle recovery is much slower, and may even be indefinitely postponed. Even when voluntary movement begins to reappear in a previously paralyzed muscle, we must be careful to avoid stretching the muscle passively. Thus, for example, in a paralyzed quadriceps extensor muscle, the first sign of recovery is seen as a feeble voluntary pulling-up of the patella in the limb which has hitherto been kept extended. If the patient's knee be allowed to flex at this stage, a disastrous relapse will almost certainly occur.

Before resorting to anything in the way of surgical procedure, we

have to try and determine how much recovery is likely to take place under appropriate **Postural,** light **Massage,** and **Electrical Treatment.** Here the electrical reactions of the paralyzed muscles are of considerable prognostic value. At the outset it may be stated that all paralyzed muscles which react to faradism will recover. The converse, however—that loss of faradic response, even with reversed polar galvanic reactions (constituting the so-called reactions of degeneration) means that these particular muscles will remain paralyzed—is, fortunately, not always true. It has repeatedly happened that recovery takes place in muscles where reactions of degeneration have been observed. Doubtless some of these cases may be accounted for by the difficulty in observing electrical reactions in small children. Sometimes it is necessary to give a general anæsthetic in order to test accurately the electrical reactions. In other cases again, when faradic excitability is lost, galvanic stimulation is not a sufficiently delicate test to estimate the degree of the degeneration. In such cases the recently introduced method of muscle testing by a series of condenser discharges of increasing wave-lengths is of value. As a muscle fibre degenerates condensers of longer and longer wave-lengths are required to produce muscular contraction.

Our first duty, then, in paralysis of this sort is to place the limb in such a posture as to avoid stretching the paralyzed muscles. Overstretching, with all its evil effects, is produced by gravity, by overaction of opposing muscles, or by faulty position of the limb. Having grasped this fundamental maxim, massage and electrical treatment may now be employed, realizing the further important point that under no circumstances should the relaxed and paralyzed muscle be even momentarily stretched, since the success of treatment depends upon undisturbed continuous relaxation. These points are emphasized in Robert Jones's[1] lucid oration before the Medical Society of London.

How long should this postural treatment be maintained, and what are the tests of recovery ? Jones answers the question as follows : In the case, say, of paralysis of the extensors of the wrist, where the hand, by means of a suitable splint, has been kept dorsiflexed, as soon as the hand can be voluntarily moved into still further dorsiflexion we may reduce the angle of the splint by a few degrees. If the power of voluntary dorsiflexion does not diminish, the angle is slowly reduced, week by week. This relaxation should only be permitted during the daytime. In bed, the original angle of the splint should be maintained. To discard the splint as soon as voluntary movement begins to reappear is to court a disastrous relapse.

In the early stages of treatment the only **Operative Procedures** which Jones judges to be expedient are those necessary to allow postural relaxation of the overstretched muscles. These procedures consist mainly in tenotomies ; especially of the tendo Achillis in talipes equinus or equinovarus ; also in the division of bands of fascia, often supplemented by removal of a skin-area from the front of the ankle,

" to obviate the disloyalty and carelessness of parents, who do not see the importance of keeping a foot constantly and for a prolonged period in the over-corrected position."

Another dictum of this philosophic orthopædic surgeon is that "no operation such as tendon-transplantation or arthrodesis should be discussed until all deformities have been corrected and retained in correction for at least a fortnight." After this period, in a chronic case, the various problems of tendon-transplantation in a partially paralyzed limb, or of fixing a flail knee or ankle-joint by arthrodesis, are then a question for the orthopædic expert. After the operation of tendon-transplantation a long period of rest is required before re-education of the grafted tendon is permitted. Three months or more may be required by muscles grafted to supplement or replace those of the calf, whilst in the case of invertors or evertors of the ankle, four to six weeks may suffice. Then comes the stage of massage and cautious exercises, supported by suitable splints, so as to prevent the harmful effect of body weight during walking.

Tendon-transplantation should not be undertaken in children under five years of age, for several reasons: (1) Because of the technical difficulty in manipulating small tendons during operation; (2) Because the surgeon must be sure that enough time has elapsed to give the muscles a chance of recovery without operation; and (3) Because it is essential that the child should be old enough and intelligent enough to help voluntarily in the treatment.

Arthrodesis, or surgical ankylosis, of the knee-joint should never be performed on a child. Jones frankly admits that although he used to recommend this operation in childhood, more mature experience has now brought him to a contrary opinion. No knee-joint should be fixed until the patient is old enough to appreciate the arguments for and against operation. Apart from the risks of operative failure, many a patient may prefer a light support, whereby he may be less awkward than with a permanently stiff knee. Arthrodesis of the ankle-joint is quite another matter, and is often of considerable advantage. Even in these cases, however, Jones holds that the operation should never be performed upon a child under the age of eight, and it is better to delay even longer. The hip and wrist should never be ankylosed by operation; nor does Jones see any advantage in fixing the elbow-joint. Arthrodesis, it must be remembered, is a mutilating operation, and should be our last resort. Once a mistake is made it is irreparable.

Ordinarily, splints used in treating these paralytic deformities are made of plaster-of-Paris, or of steel and leather, or sometimes of aluminium. At the best, this sort of saddlery, even when constructed by an ingenious instrument-maker, is heavy and cumbrous, and tends to immobilize not merely the limb but the patient, by preventing the exercise of non-paralyzed muscles. Moreover, in the case of growing children the expense of fresh apparatus every year or so is a severe drain on the financial resources of a poor family. To Calot[2] of Berck-

sur-Mer, belongs the credit of having introduced **Celluloid Splints,** which are simple and effective and at the same time cheap. Batten,[3] in London, has emphasized their value, pointing out their lightness, and the ease with which they can be removed for washing and for massage.

There are three steps in the manufacture of these splints: (1) Taking a 'negative' cast of the patient's limb; (2) Making a 'positive' plaster cast from the negative; (3) Moulding the celluloid splint on the positive. Of these three processes, it is essential that the first should be performed by the medical man himself, to ensure that the limb is in the correct position, otherwise the splint will be useless. The second and third stages can be carried out either by the medical man, or by an instrument-maker, or even by a specially trained nurse.

1. *Taking the Negative Cast.*—The materials required are as follows: A strip of lead ¾ in. wide and 2 to 3 feet long, some oil, a strong sharp-pointed knife, and a supply of plaster-of-Paris bandages, 4 to 6 yards long and 4½ in. wide, made of book-muslin, loosely rolled, and not too heavily loaded with plaster. The affected limb—say the leg—is first shaved if the individual is hairy. The skin is oiled, and the strip of lead, also oiled, is adjusted to the front of the leg. If it be the leg, a thin layer of beeswax is placed over the malleoli. The limb is now held in the required position, the knee being always very slightly flexed and the foot carefully placed at right angles with the leg. This is the most important detail in the whole process. Care is needed not to hyperextend the knee, nor to dorsiflex the foot, otherwise walking will be hindered instead of helped. The plaster-of-Paris bandages are placed in warm water, and after being squeezed out are wound round the limb, beginning at the foot and working up the thigh. A few extra turns are needed over the ankle and knee. For a child of six to eight years old, four or five bandages are usually required. In from three to five minutes, when the plaster has sufficiently set, a cut is made in the anterior aspect of the cast, down to the lead, being careful to divide all the fine threads, so that the cast may open out cleanly without displacing portions of bandage. The cut edges of the plaster are separated and the lead is removed through the incision. The cut edges are now further separated to allow the leg to be removed. This is best effected by catching the patient's toes and pulling them forwards, whilst an assistant separates the edges of the cast and pushes it backwards. When the cast has been removed, the cut edges are carefully approximated, and a single layer of plaster-of-Paris bandage is wound around the cast, the toe-end being completely covered in. The 'negative' cast is now complete and is allowed to dry.

2. *Making the 'Positive' Cast.*—After twelve to twenty-four hours, the negative cast is dry. Its inner surface is oiled afresh, a bamboo cane is placed down the centre, and plaster-of-Paris, mixed to the proper consistence, is poured in and allowed to set. After twelve hours an incision is made down the anterior surface, the negative is peeled off, and the positive is removed.

3. *Moulding the Splint on the 'Positive.'*—The materials required are stockingette, book-muslin, Gauvain's celluloid solution (11 oz. of celluloid to 160 oz. of acetone, to which should be added 3 oz. of calcium chloride dissolved in 2 oz. of hot water, added whilst still hot to the celluloid solution and well shaken up); celluloid varnish (cellulose tri-acetate 1 part, acetone 5 parts), leather or braid for binding the splint, and boot-hooks for lacing it up. A layer of stockingette is fixed over the cast and sewn on. Over this is placed a layer of book-muslin, cut so as to conform to the shape of the limb. On these a layer of celluloid solution is painted. Then another layer of book-muslin followed by another coat of celluloid, and so on, until fourteen to eighteen coats have been applied. It is well to allow each coat to dry before applying the next. Around the ankle and knee the splint should be reinforced, especially at the back and sides, by three or four extra layers of muslin and celluloid. After the final coat is laid on, a coat of celluloid varnish is applied. Then two parallel incisions are made down the front of the splint and a strip about ½ in. wide is removed. This allows the positive to be removed from within the splint. The inner layer of stockingette, which has not been impregnated with solution, may be removed. The inner surface of the splint is then painted with the celluloid solution.

The splint is now fitted on the patient's limb. If the cast has been well made, the fit is usually perfect. Small edges of the splint may require to be trimmed away about the knee and ankle, to allow of taking it off and on easily. The splint is bound with leather or braid, the latter being painted over with celluloid varnish, and hooks are fixed along the edge of the incision. It is now ready for wear. It is worn next to the skin, which should be freely treated with boracic dusting powder. It is not advisable for the patient to wear a thick stocking inside the splint; this spoils the fit. If the splint appears uncomfortably tight at any part, e.g. over the malleolus, it should be stretched and manipulated to relieve the pressure, and it may sometimes be necessary to cut a hole and to pare off its edges in the region of the malleolus. A celluloid splint of this sort is applicable to a very large proportion of cases of paralysis of the lower limbs. The only exceptions are cases in which the iliopsoas and gluteal muscles are paralyzed, so that the hips cannot be actively moved. Cases of paralysis of spinal and abdominal muscles are less favourable than others, but even they may be benefited by a suitable celluloid spinal jacket. The extent of the splint varies according to the degree of paralysis, the principle being to support those joints which cannot be actively moved.

At what stage of acute poliomyelitis should such splints be used? For the first four weeks the patient should have complete rest in bed. Even during the first few days, if there be any tendency to deformity, a temporary light splint of ordinary materials should be employed. At the end of a fortnight, when all pain has subsided, a cast of the limb should be made, and the celluloid splint moulded thereon. The

splint should be worn continuously night and day at first, being only removed for washing the limb and for treatment.

In addition to cases of poliomyelitis, celluloid splints may also be used to correct deformities resulting from other diseases. Thus in wrist-drop or foot-drop, whether from peripheral neuritis or from trauma, a celluloid splint, by preventing stretching of the paralyzed muscles and by correcting the mal-posture, will hasten recovery. Also in tabetic arthropathy, e.g. of the knee-joint, walking is rendered much easier, and at the same time further effusion into the joint is prevented.

REFERENCES.—[1]*Lancet*, 1914, i, 1515; [2]*Orthopédie Indispensable*, Paris, 1913; [3]*Clin. Jour.* 1913, Nov. 529.

POLYCYTHÆMIA. *Herbert French, M.D., F.R.C.P.*

Friedman[1] describes a condition of considerable polycythæmia associated with certain cases of non-bleeding duodenal ulcer, and records twenty-five actual cases, the number of red cells per c.mm. varying from 5½ to 8 million. In his opinion, the presence of polycythæmia is an important point in distinguishing duodenal from gastric ulcer, for although the converse is not true—many cases of duodenal ulcer have a reduction in the number of red corpuscles per c.mm—he has not found polycythæmia in gastric-ulcer cases. He believes that pancreatic inflammation is in some way responsible for the polycythæmia to which he has drawn attention, for it may occur in cases of chronic pancreatitis without ulceration in the duodenum.

Whether it is necessarily a good thing that a patient suffering from splenomegalic polycythæmia should have his red corpuscles reduced to a level more nearly approaching normal, is open to much doubt; but that this can be effected by the use of **Benzol** in a way similar to that in which it is employed in cases of leukæmia is recorded by McLester,[2] who states that the treatment has done polycythæmia patients good, though it cannot be said to have cured them.

REFERENCES.—[1]*Med. Rec.* 1913, ii, 701; [2]*Jour. Amer. Med. Assoc.* 1914, i, 1381.

POROCEPHALIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

J. W. Scott Macfie and J. E. L. Johnson[1] record five cases in Southern Nigeria of infection of man with *Porocephalus armillatus* larvæ. In the Cameroons, Seiffert had found this parasite in 7·8 per cent of post-mortems on coloured labourers. The present writers found one complete individual consisting of twenty rings and measuring 17 mm. in length and 3 in breadth. The larvæ were found in varying numbers, chiefly in the liver, but also in the lungs and occasionally in the mesentery. As many as ten were found in the liver in one case. In three cases there was no other obvious cause of death, while clinically they showed progressive weakness, œdema, and dyspnœa, without any very definite signs to account for these symptoms. Calcified parasites may also be found encysted in the organs.

REFERENCE.—[1]*Lancet*, 1913, ii, 1387.

POST-OPERATIVE COMPLICATIONS. *F. W. Goyder, F.R.C.S.*

Beckman[1] shows that post-operative complications have been reduced almost to vanishing point at the Mayo clinic. Out of 6285 cases, escape of sterile fluid from the wound occurred in 35. All wounds which are not drained are scrupulously dried before the wound is closed. Infection came from the tissues of the patient rather than from outside sources. They numbered 117, or ·017 per cent, chiefly in appendix, gastric, and hernia operations. Infections were more frequent in the winter months. There were 19 coli infections, 46 staphylococcal, 2 pneumococcal, 3 streptococcal, and 5 other organisms. In 35 the infections were mixed. Pulmonary complications occurred in ·012 per cent. Ether was the exclusive general anæsthetic, novocain the local. Acute post-operative congestion of the lungs occurred in 21 cases, pleurisy in 18, acute bronchitis in 21, bronchopneumonia in 12, and lobar pneumonia in 15. Thrombosis took place in 14 cases, all abdominal. Acute dilatation of the stomach occurred only three times. The author believes that it has been avoided because every patient who continues to vomit after the first twenty-four hours has his stomach washed out once or twice daily, or oftener if it seems advisable, until the vomiting ceases. Cases get up on the eighth to twelfth day after laparotomy; on the sixth or seventh day after simple appendicectomy. No deaths occurred in this series.

O'Conor,[2] of Buenos Ayres, is a strong advocate of quick operating. This means less exposure of parts, and less liability to shock and sepsis. It is of no value unless combined with conscientious and thorough workmanship, and with the removal of the *fons et origo mali*. Also, in many septic cases deliberate care must be taken to isolate the operating area by sponge packing; the field must be cleared of all dead material and left dry. Unless this can be done, drainage must be employed. Incisions, especially in the peritoneum, must not be unduly restricted. For rapid and accurate work it is essential that the surgeon and his assistants be accustomed to working together. From the number, variety, and success of the cases quoted, there is no doubt that O'Conor's methods are worthy of imitation.

References.—[1]*Surg. Gyn. and Obst.* 1914, i, 551; [2]*Brit. Med. Jour.* 1914, i. 231.

PREGNANCY, DIAGNOSIS OF. *Bryden Glendining, M.S., F.R.C.S.*

Abderhalden's Test.—The literature relating to the tests devised by Abderhalden has been considerable during the present year. It will be remembered that this test depends upon the presence in the blood of a ferment capable of splitting placental proteins. Experimental work had previously shown that the injection of special protein substances would produce in the blood of the animal a ferment which was capable of splitting that protein substance. Now, it is known that the chorionic villi of the growing ovum, to a certain extent enter the the blood-stream, and it is inferred that in consequence of the presence

of chorionic tissue in the maternal organism, a ferment is called forth as part of a protective mechanism. Consequently, Abderhalden's test depends upon the presence in the maternal organism of chorionic villi, and the resulting protective ferment is capable of detection from the sixth week of pregnancy until fifteen days after delivery or abortion, and also in hydatidiform mole and chorion-epithelioma.

The means of detecting the ferment acting in vitro are: (1) Optical; (2) By dialysation.

In applying the optical test, placental peptone is obtained by washing and then chemically treating placental tissue so that a pure placental peptone is isolated in solution in physiological saline. To this solution some blood serum from the patient to be tested is added in a special polarimeter tube, in order to maintain a constant temperature. The action of ferment when studied through the polarimeter shows differences of rotation, which can be read off at intervals, and the amount of rotation gives the index of activity of the ferment in the serum. With a serum from a pregnant woman the rotation should be 0·2° at least. This method is admittedly the more reliable test of the two, but is not so popularly employed, because the polarimeter must be a good one, and a certain experience and skill is required in using it.

Wallis[1], who contributes a valuable critical review of the subject, in quoting his own results, states that he has never failed with the optical test, and uses it always to control the other method. He quotes Freund and Brahm as finding a discrepancy when both tests were employed in the same cases in about 33 per cent. Abderhalden himself insists that the polarimeter is much the more reliable method.

The dialysation test is simply another means of detecting the action of the ferment in the serum upon the placental peptone; the result of the action is allowed to dialyse through membrane, and special delicate chemical tests are used in the detection of the dialysable substances. Possible errors in technique are serious, while the liability to chemical impurities and the instability of the substances used are additional factors making for variable results. This test has been much more extensively used than the optical one, and as might have been expected from the innate difficulties and sources of error, it has not infrequently been condemned as unreliable. To these latter, Abderhalden[2] replies, pointing out that (1) centrifugalizing the blood by throwing down the ferment together with the blood cells, (2) using blood which is hæmolytic, and (3) insufficiently testing the filters beforehand, are all common sources of error which invalidate most of the unfavourable opinions recorded. Those interested in the published results should see Wallis's paper,[1] where the whole literature of the subject is reviewed; suffice it here to state that much remains to be done; that the application of the tests requires specially skilled workers; that the results appear reliable just in proportion to the technical ability of the operator; and finally, that the dialysation test, except in experienced hands, is of doubtful value.

The next point which arises for consideration, is whether the 'ferment' present in the serum of the pregnant woman is 'specific.' The most contradictory statements are to be found in the literature. Wallis[1] has tested the serum ferment of the pregnant woman upon carcinoma tissue, and the serum of a cancer case upon placental proteins in numerous instances, and never once seen any evidence of ferment action, whereas King,[3] in an attempt to prove the specificity of the serum, found that it acted upon cancer tissue or placental protein indiscriminately. Schafer,[4] in two instances of pregnancy and two cases of carcinoma, found that both placental and carcinoma tissues were broken down. Further instances of such contradictory statements could be quoted, both as regards cancer cases, and also with regard to the action on fœtal tissue and eclamptic placental tissue, and finally as to the action of the serum of eclamptic patients upon placental tissue. These discrepancies in results are to be taken as indicating the complex and difficult nature of the tests, and only the accumulation of further results can determine the question of specificity of the serum ferment in pregnancy.

Behne[5] has applied the dialysation test to cattle which were subsequently slaughtered. The results showed that of nine non-pregnant cows three were positive, and some pregnant cows gave a negative or doubtful reaction. He concludes that the test is unreliable.

References.—[1]*Jour. Obst. and Gyn. of Brit. Emp.* 1914, 53; [2]*Monats. f. Geb. u. Gyn.* 1913, Bd. ii, Hft. 1; [3]*Jour. Obst. and Gyn. of Brit. Emp.* 1913, 296; [4]*Centr. f. Gyn.* 1913, No. 23; [5]*Ibid.* 1914, No. 26.

PREGNANCY, ECTOPIC. *Bryden Glendining, M.S., F.R.C.S.*

Etiology.—After examining with great care and detail the tubes in 68 cases of extra-uterine gestation in order to elucidate, if possible, the cause of the abnormal implantation of the ovum, Huffmann[1] finds support for Webster's view, that the embedding always takes place in Mullerian tissue and never in peritoneum. The ovary, which apparently forms an exception, has also been found occasionally to show Mullerian structures; he admits, however, that it was impossible to demonstrate Mullerian tissue in one case. Of the tubes examined, 54 per cent showed abnormal development comprising reduplication, accessory ostium, or some other defect. Any evidences of inflammation or obstruction were seldom found.

Prognosis.—It is often of importance to know what effect salpingectomy for tubal gestation is likely to have upon the future obstetric history. Smith,[2] reviewing the cases operated on some years previously, gives the subsequent history both as regards extra- and intra-uterine pregnancies. The figures relate to cases the history of which had been followed during at least five years after operation.

In 144 cases in which pregnancy was conceivably possible from the apparently patulous state of the tube at the time of operation, uterine pregnancy occurred in 47, and a second ectopic pregnancy in 21. If the cases were divided into two categories, (*a*) 67 cases under thirty

years of age, in which there were subsequently 27 cases of uterine pregnancy and 10 of ectopic pregnancy, and (*b*) 74 cases over thirty years of age, showing subsequent pregnancies in the uterus in 19 instances and ectopic in 11 cases, it is seen that the lower age-period shows a greater proportion of uterine pregnancies.

Therefore, although less than half the cases of extra-uterine gestation have subsequently a normally situated pregnancy, nevertheless the figures are sufficient to warrant leaving the opposite tube, in the absence of any gross pathological lesion. Salpingostomy, performed in one case, had not been successful.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1913, ii, 2130; [2]*Surg. Gyn. and Obst.* 1914, ii, 684.

PROSTATE, CANCER OF.

Radium used in treatment (*p.* 68).

PROSTATE, DISEASES OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Prostatism.—The following conclusions are reached by Wade.[1] Three varieties of disease lead to prostatism: (1) Prostatic hypertrophy, or chronic lobular prostatitis; (2) Prostatic fibrosis, or chronic interstitial prostatitis; (3) Prostatic carcinoma.

Chronic lobular prostatitis, the author holds, is a senile hyperplasia, not the result of an independent new growth, but liable to develop into one. It develops in the middle lobe, and is almost uniformly confined to this and the lateral lobes. It may cause prostatism without enlargement of the organ, intravesical projection, or complete false-capsule formation. The successful performance of suprapubic prostatectomy depends on the presence of an advanced type of prostatic hypertrophy due to chronic lobular prostatitis. When a patient with this advanced type of disease is operated on, his urinary tract and general health have usually suffered serious damage from the disease. The mortality attending suprapubic prostatectomy is mainly due to the impaired health of the patient prior to operation. The actual cause of death in such cases is usually a local infection arising out of the wound inflicted. Suprapubic prostatectomy by blind enucleation is unsuitable in cases of prostatism due to other causes than advanced lobular prostatitis, perineal prostatectomy being more suitable. This permits of the removal of the disease when its presence is diagnosed, in all cases. It is therefore, at present, the operation that offers the best prospect of further advance in the treatment of prostatism. The suprapubic transvesical method of prostatectomy by vesical dissection offers the prospect of developing into a method of treating prostatism that may ultimately warrant its adoption in a large number of cases.

Chronic interstitial prostatitis is best treated by division and removal of the constriction by the transurethral route. Prostatic carcinoma, when recognized clinically, may be successfully treated by excision of the gland in suitable cases.

Bugbee[2] records his experience in the use of the **High-frequency Spark** for the relief of certain cases of prostatic obstruction. The cases included obstruction from a hard fibrous prostatic ring, prostatic nodules left after perineal operations, median bar obstruction, a small median lobe, and diffuse carcinoma of the prostate and vesical wall. In all the malignant cases the disease was advanced and inoperable. "The patients have been greatly benefited, the vesical orifice freed, pain relieved, absorption lessened, and life made endurable." The method consists in the destruction of prostatic tissue by direct contact with the high-frequency spark, the current being applied by means of an insulated wire introduced into the bladder through the cystoscope. The mucous membrane of the bladder and urethra is previously rendered anæsthetic by the instillation of a solution of 4 per cent novocain in 1–16,000 adrenalin, which is allowed to remain in the bladder for half an hour. The strength of current varies with the amount of tissue to be destroyed. As a rule $\frac{1}{10}$-in. spark in the muffler is sufficient. The electrode is kept in contact with the tissues until the bubbles cease to form, usually about one minute. The destruction of tissue with such an application extends to a depth of $\frac{1}{4}$ in. Several sittings (eight or ten) are required. The slough separates in about ten days. Raymond Stevens[3] has also used this method, and reserves it for cases in which "a comparatively small portion of prostate at the vesical neck is causing a relatively large degree of obstruction." The urethra must be tolerant to instrumentation.

Prostatectomy.—In discussing the proper age for prostatectomy, Legueu[4] holds that this is no longer an operation for the aged, and year by year the age for operation gets earlier. When the operation was confined to old men, some of the patients succumbed from their advanced age, who would have survived had they been operated upon earlier. The suprapubic operation has shown a steady improvement in the statistics every year as the patients are operated on earlier, and the reproductive function is not interfered with in younger subjects. The author further states that the hypertrophied prostate exerts a certain toxic influence on the organism, manifested by changes in arterial tension and by circulatory disturbances.

Beer[5] regards the following three factors as important where prostatectomy is proposed for a patient with adenoma of the prostate: (1) The anatomical and functional condition of his urinary tract; (2) Of his heart; (3) Of his arterial system. Cystoscopy should be performed, to exclude papilloma and calculi in diverticula. He also recommends *x*-ray examination for calculi of the kidneys, ureters, or bladder. In regard to the tests for the renal function, he states: "It can be said with absolute truth, that the nearer a patient comes to a condition in which his excretion of these various substances is zero, provided his supravesical disturbance is symmetrical, the greater the risk of any operative procedure, and those with zero excretion should not be operated upon until they have been treated preliminarily, and their kidneys given a chance to improve. The only method

that gives information in regard to the heart function is the observation of its activity under normal conditions and under stress.

Deaver[6] summarizes the advantages of the suprapubic over the perineal operation of prostatectomy, as follows: The approach to the prostate is simple and practically bloodless. The enucleation of adenomatous growths is accomplished with ease. The working field is large and under perfect control. The prostate is accessible, and can be made more so by digital pressure on its rectal surface, and without the danger of injury to the bladder from the use of tractors, necessary in the perineal operation. The muscular control of the bladder is not disturbed, since the internal sphincter may be avoided and the compressor urethræ lies outside the line of cleavage; incontinence is therefore less frequent, following this operation. Permanent fistulæ are less frequent after the suprapubic operation. They never occur if instruments are passed along the urethra. Stones can be more easily removed. Sexual potency is retained as frequently after the suprapubic operation as after the perineal, and the question of sterility is rarely of any consequence. The mortality in properly selected cases is no greater, and the percentage of uncomplicated cures is larger.

Lower[7] regards the shock-producing factors of prostatectomy as the anæsthetic, the amount of painful traumatism, and the hæmorrhage. He recommends the administration of a hypodermic injection of morphine and scopolamine an hour before operation, and immediately before the operation the bladder is irrigated and filled with a 5 per cent solution of alypin. Nitrous oxide-oxygen is the anæsthetic used, and the different layers of the abdominal wall, the bladder wall, and the prostate are infiltrated with novocain solution (1–400). After enucleation of the prostate, strips of gauze are packed alongside the catheter on the top of the mucous membrane at the bladder neck to prevent hæmorrhage.

In the experience of MacGowan,[8] the usual vertical median incision for the suprapubic exposure of the bladder has many disadvantages. The " septum between the recti muscles " is often difficult to find, and if the incision is made close to the symphysis, the pyramidalis muscles lead to confusion. In stout patients, retraction is difficult and the exposure poor. There is danger of " breaking down the cellular tissues in the space of Retzius," and injury to veins, with septic infection. It is difficult to close the incision so as to avoid a post-operative hernia. To obtain more room the fascia must be cut transversely, and the recti severed " close to the pubic lines." This also, according to the author, makes a " nasty weak spot " in the abdominal wall. As a substitute, he advocates a transverse incision through the skin, fascia, and sheath of the recti muscles. The recti and pyramidalis are exposed and split in the middle line. The remaining stages of the operation might be equally done though a vertical or a transverse incision.

Lilienthal does a two-stage operation in all cases of prostatec-

tomy. The bladder is first opened and drained under local anæsthesia, and the prostate is removed eight or nine days later under general anæsthesia. If hæmorrhage is profuse, a gauze packing is placed on the mucous membrane, " which has now fallen into the hollow from which the prostate was removed."

Lilienthal does not practise cystoscopy before the operation unless he suspects from the small quantity of residual urine, that some other disease than enlarged prostate is present. After the operation, however, he uses the cystoscope before the suprapubic wound has closed. The cystoscope is inserted through the fistula, and a careful inspection made for sloughs and loose tissue. In 38 cases of prostatectomy there were 7 deaths, or 18·42 per cent.

Pilcher[10] reverts to the older view of the pathology of obstructive prostatic hypertrophy, that it usually involves the two lateral lobes and the median lobe, and he disagrees with the view advanced by Zuckerkandl and Tandler that only the middle lobe is involved, and the lateral lobes are compressed and atrophied. In discussing the choice of treatment, he holds that in those cases where obstruction has reached the stage of the regular use of the catheter, infection takes place sooner or later, and the average length of life is less than three years. All this time the patient " lives in filth and misery, and is a burden to himself and a trial to his friends." The natural line of approach in operating on this condition is the suprapubic route. As a result of relieving the distention of the bladder by preliminary cystotomy, three phases of kidney secretion are observed. The first phase lasts two days, and during this the blood-pressure remains high (200 to 220 mm. Hg), the urinary output will average 70 to 120 oz., the phenolsulphonephthalein test will frequently average above 60 per cent in two hours, and the urine will show only a trace of albumin. In the second phase, which lasts from the third to the sixth day, there is a lowered blood-pressure (170 to 180), the daily urinary output has dropped to 15 or 20 oz., the amount of albumin has increased enormously, and the functional capacity of the kidney as shown by the phenolpthhalein test is only 15 per cent. This change has taken place following suprapubic drainage of the bladder without loss of blood or shock due to anæsthesia or prolonged manipulation. The third phase is found on the seventh to the tenth day. The blood-pressure has decreased (160 to 170), the urinary output has increased from 40 to 50 oz. in the day, and the phenolphthalein test shows the renal function increased from 15 to 50 per cent, while the amount of albumin has decreased very markedly, although still greater than it was before the cystotomy. The second phase may last from a day or two to many weeks, and if the reaction to the third phase does not take place within ten days to two weeks, the surgeon should not under any circumstances remove the prostate. The author advocates a two-stage operation in every case. In some cases of enormous distention the bladder should be drained with a catheter in the urethra for some time before resorting to suprapubic cystotomy.

For the control of hæmorrhage after enucleation he advocates three methods : (1) The introduction of a speculum, and clamping or the application of the cautery to any bleeding points ; (2) Surrounding by a continuous catgut suture the area from which the prostate has been removed ; (3) By pressure between the finger in the rectum and that in the bladder, and by gauze packing round a catheter in the urethra. A Pezzer's catheter is used to keep the gauze packing in place.

Lynn Thomas[11] pours pure **Weak Tincture of Iodine** (*tinct. iodi*, B.P. 1898) into the bladder before enucleating the enlarged prostate suprapubically. Weak tincture of iodine is then injected along the urethra into the prostatic bed. Forceps are passed through the bladder into the prostatic cavity, and a perineal opening for drainage is made upon the point.

In an investigation of the normal bladder and its sphincters, and the changes following suprapubic prostatectomy, A. Hyman[12] used the method of Voelcker and Lichtenberg of filling the bladder with collargol solution and obtaining an *x*-ray picture. In the normal bladder he found the shape variable, but the most frequent type showed a broad upper portion narrowing towards the outlet, and a few showed a round or an oval contour. In prostatic enlargement characteristic changes were found. Instead of a broad upper part narrowing at the outlet, the inferior portion of the bladder was broad and flat or sinuous, and the bladder was situated on a higher plane than usual, the level depending on the size of the gland. Its base was found to be opposite the upper border of the symphysis, or more often 1 to 2 cm. higher. The author states that " the mechanism of sphincteric control after prostatectomy is still imperfectly understood." He examined the bladder in thirty-eight patients after prostatectomy, and found that the characteristic contour remained practically unchanged except in a few cases where the bladder was found on a higher level than in the unoperated case. The vault of the bladder often assumes a pear-shaped form, probably due to adhesions to the abdominal wall. At the outlet of the bladder, in the majority of cases there was the shadow of a second smaller cavity corresponding to the defect left by the removal of the enlarged gland. This shows that the true sphincter of the bladder following suprapubic prostatectomy is situated at the membranous portion of the urethra. He confirmed this by urethroscopic examination and by emptying the bladder by a catheter passed through the compressor muscle. [The author has overlooked the fact that this observation was made by the present writer, and published so far back as 1905, in introducing a discussion on the surgical anatomy of the prostate at the Anatomical Society of Great Britain and Ireland.[13] This subject was further discussed fully by the writer at the Second Congress of the Association Internationale d'Urologie, held in London in 1911.[14]—J. W. T. W.]

Bentley Squier[15] refers to the mortality in cases of prostatic obstruction not subjected to operation. Fifty per cent of unoperated patients

will, he states, die within five years from the onset of obstructive symptoms when catheter life is not necessary. The beginning of catheter life shortens this expectation of life almost 50 per cent (two years and eight months), and increases the mortality to 66⅔ per cent within the shortened period. The average length of life of the cases of carcinoma was thirteen months from the onset of the symptoms. Of 100 patients operated on for benign hypertrophy, 87 are alive and completely relieved from obstructive symptoms at periods ranging from one to four years.

REFERENCES.—[1]*Ann. Surg.* 1914, i, 321, and *Brit. Med. Jour.* 1913, ii, 1080; [2]*Med. Rec.* 1914, i, 293; [3]*Amer. Jour. Surg.* 1914, i, 93; [4]*Med. Press and Circ.* 1914, 218; [5]*Med. Rec.* 1914, i, 471; [6]*Ann. Surg.* 1914, i, 360; [7]*Ibid.* 278; [8]*Jour. Amer. Med. Assoc.* 1913, ii, 1863; [9]*Ann. Surg.* 1914, i, 373; [10]*Ibid.* 500; [11]*Lancet*, 1914, i, 1456; [12]*Ann. Surg.* 1914, i, 544; [13]*Jour. Anat. and Phys.* 1906, Apr.; [14]*Deuxième Congr. de l'Assoc. Internat. d'Urol.* 1912, 422; [15]*Surg. Gyn. and Obst.* 1913, ii, 433.

PRURITUS ANI.

(*Vol.* 1914, *p.* 507)—Resorcin may be usefully employed in an alcoholic 5 per cent solution, applied frequently until relief is obtained.

PSORIASIS. *E. Graham Little, M.D., F.R.C.P.*

Three views of the causation of psoriasis may be said to be held by a sufficiently large number of authorities to deserve consideration. These are: (1) That it is due to a parasite; (2) That it results from disturbed metabolism; (3) That it is a disease of neuropathic origin.

The third view has not been considered as worthy of investigation as the first two, which are the subject of an important combined research by Schamberg, Ringer, Raiziss, and Kolmer,[1] who thus record the result of their two years' study. No confirmation of the view which ascribes the disease to a microbic infection has been made. Twenty-two different organisms were isolated from psoriasis scales, but none of them could be shown to have any etiological significance. On the other hand, the authors realized early in their studies that psoriatic patients possessed the power of retaining large quantities of nitrogen on diets on which normal persons would just maintain equilibrium. Clinically, a definite relation could be established between the protein metabolism and the course of the disease, a high protein diet accentuating the spread of eruption. No harm is caused by keeping patients on a very low protein diet for long periods, provided the caloric supply is sufficient to maintain the body weight. Dieting is therefore of great importance in controlling the disease, even without local or other treatment. Two samples of the feeding recommended are detailed on pages 482, 483.

This diet is more especially effective in acute stages. It may be continued strictly for several weeks, the chief desideratum being the restriction of the nitrogen intake to 5 grams per diem.

Arguments for the microbic causation of psoriasis had been drawn

DIET I.

Food	Amount, grams	Nitrogen, per cent	Nitrogen, grams	Calories
Breakfast				
Bread	20	1·55	0·31	53
Butter	15	0·12	0·02	113
Grape-nuts ..	10	1·96	0·20	40
Orange	180	0·128	0·23	83
Apple	135	0·064	0·09	77
Tea	125	0·015	0·02	—
Cream	30	0·336	0·10	57
Total	—	—	0·97	423
Lunch—				
Bread	15	1·55	0·23	39
Butter	15	0·12	0·02	113
Grapes..	150	0·208	0·31	129
Lima beans	50	1·21	0·60	37
Turnips	75	0·118	0·09	31
Corn-starch ..	189	0·065	0·12	297
Potato-cake	300	0·275	0·82	273
Tea	125	0·015	0·02	—
Total	—	—	2·21	919
Supper—				
Bread	25	1·55	0·39	66
Butter	15	0·12	0·02	113
Prunes..	88	0·08	0·07	63
Cauliflower	75	0·338	0·25	22
Corn	100	0·386	0·39	95
Celery	25	0·176	0·06	5
Potatoes	200	0·255	0·51	182
Total	—	—	1·69	546
Total for day ..	—	—	4·87	1888

from the observation that remedies supposed to be germicidal were most effective in curing the eruption. The authors demonstrated in a series of experiments that chrysarobin, the most efficacious drug in clearing psoriasis, is very feebly germicidal. Its remedial action is to be explained by its reducing power, and by a certain remarkable affinity for the protein elements of the skin.

The same authors, in an earlier paper,[2, 3] contribute a more detailed description of their investigations on these lines, which will repay careful study. The main features have been abstracted above. A point which is mentioned in the longer article and not in the shorter is the circumstance that in over 18 per cent of the cases with one form of test, and in over 28 with another, a positive result was obtained with Wassermann's reaction. In some of these instances a possibility of latent and unsuspected syphilis is admitted, but this explanation

Diet II.

Food	Amount, grams	Nitrogen, per cent	Nitrogen, grams	Calories
Breakfast—				
Bread	20	1·81	0·36	53
Butter	15	0·12	0·02	113
Grape-fruit ..	146	0·13	0·19	67
Banana	99	0·208	0·21	87
Puffed rice	10	1·17	0·12	36
Cream	30	0·397	0·12	57
Total	—	—	1·02	413
Lunch—				
Bread	16	1·81	0·29	42
Butter..	15	0·12	0·02	113
Corn-starch ..	150	0·138	0·21	236
Cabbage	75	0·198	0·15	22
Lima beans	75	0·789	0·59	55
Potato-cake	250	0·323	0·81	277
Total	—	—	2·07	695
Supper—				
Bread	25	1·81	0·45	66
Butter	15	0·12	0·02	113
Lettuce	25	0·192	0·05	5
Beet	100	0·17	0·17	37
Cornmeal	125	0·246	0·31	188
Prunes..	86	0·08	0·07	62
Sweet potatoes ..	100	0·216	0·22	195
Cream	20	0·397	0·08	38
Total	—	—	1·37	704
Total for day ..	—	—	4·46	1812

cannot be accepted in all. Its significance remains unexplained, and must await further investigation.

Tidy,[4] commenting on the findings of these authors, remarks that the retention of nitrogen is common in all widespread inflammations of the skin. It is apparent and not real, and is accounted for by loss of nitrogen from the surface of the skin. The scales shed have a very large content in nitrogen. There is no evidence of retention of nitrogen in psoriasis after the disappearance of the eruption. The clinical evidence produced showing that cases did well on low, and badly on high, protein diets, is of value, and possibly a low protein diet combined with chrysarobin is the ideal treatment.

X Rays used in treatment (*p.* 66).

References.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 729 ; [2]*Jour. Cutan. Dis.* 1913, 696 ; [3]*Ibid.* 802 ; [4]*Brit. Jour. Derm.* 1914, 45.

PSYCHASTHENIA.—(*See* Neuroses in Children.)

PSYCHO-ANALYSIS. *Bedford Pierce, M.D., F.R.C.P.*

There continues to be much controversy as to the value of psycho-analysis, and authorities tend to be divided into two camps, between which there seems to be little fellowship and sympathy. A number of experienced men look upon psycho-analysis as a means of treatment of the utmost value, books and magazines exclusively devoted to the subject steadily increase in number, and Freud is acclaimed as one of the greatest thinkers of the age. On the other hand, Freud's more extreme views are unhesitatingly rejected by many writers on the subject, and some find it difficult in discussing the subject to conceal their impatience or repugnance. Exception is taken to the rôle ascribed to sexual factors in the production of mental symptoms, and in particular to the importance assigned by Freudians to infantile sex experiences and phantasies in the evolution of hysteria. The English reader will find psycho-analysis discussed at some length in the MEDICAL ANNUAL for 1910–12, 1914, and in articles by C. G. Jung[1] and J. A. Ormerod.[2]

Smith Ely Jelliffe,[3] in a series of articles dealing with the technique, discusses the circumstances under which psycho-analysis is likely to be unsuccessful. These cases are divided into two groups : (1) Those which cannot be analyzed ; (2) Those which should not be attempted, either because no benefit will result, or there is risk of harm to the patient, to the analyst, or to society.

The impossible cases are stated to be those that are too ignorant, including ' all feeble-minded types.' Similarly, demented patients, especially those showing decided mental deterioration, are not likely to receive benefit, although in some cases an analysis will explain many symptoms that may be exhibited. Alcoholic patients, general paralytics, and senile cases must be looked upon in the same way. Mania and acute catatonia are unapproachable, as well as delirium and all forms of extreme excitement. Mute patients are impossible, and, as a rule, acutely depressed patients are very difficult, if not impossible, and in dealing with them, suicidal tendencies are quickly revealed and must be guarded against.

With reference to the groups for which psycho-analysis would be unwise, Jelliffe first refers to persons who are flighty, shallow, and inclined to gossip. These he calls the 'little bird' group. They go from doctor to doctor, and usually are parasitic on some relative. Many have no desire to recover. Others who are in good circumstances endeavour to buy attention with their money, want to be fussed over, and look for flattery and self-indulgence. Some patients do not seriously respond to analysis, and are unwilling to take the necessary trouble. " Beginning analysts should avoid working with hysterical young people. They should not attempt a compulsion neurosis without experience." In paranoid cases harm may come to the analyst himself owing to the establishment of a transference which may later lead to actual violence. Warning is given against taking on free cases, especially of compulsion neuroses. These are

analyzed with great difficulty and take an immense amount of time. If by stress of more important work he is obliged to neglect the patient, he is apt to be abused. One trained in psycho-analysis recognizes that behind the vituperation there lies a great regard for the analyst, but " such patient's utterances constitute a large part of the as yet detailed evidence against the value of the method."

It is desirable that young girls with disturbed erotic phantasies should be placed under the care of a woman physician. " Psycho-analysis, even of the most careful kind, at times does harm to the analyst in many such cases. The almost pathological transference causes the patient to interfere with the analyst's time, and when she is rebuffed, strong resistances develop and the hysterical patient becomes an active enemy of the physician. She talks about him continuously ; . . . particularly how he tried to misuse her (her own non-realized wish fulfilment). She carries gossip and scandal wherever she can get an opportunity, and may be able to place the analyst in a very unpleasant position.

" One not infrequently finds a certain group of patients who unconsciously start out with the idea of getting the analyst interested in them. . . . They unconsciously flatter the analyst, and finally succeed in getting the upper hand. The psycho-analytic probe can no longer do its work. The analyst is powerless. He has perhaps succumbed to his own complexes, and his usefulness is seriously hampered. . . . When beauty, wealth, and social position are combined, the analyst who establishes strong transferences must be on his guard." " The psycho-analytic method develops special means by which strong transferences are set up, just as in hypnosis similar transferences may be seen, but in a limited group of cases. It also should provide the analyst, who is conscientious in his work, with special means for handling these usually very strong transferences which are seen in all neurotics."

Manic-depressive psychoses are said to cause much anxiety to patient as well as to analyst, and a complete Freudian analysis is best avoided. Stetsel is quoted as recommending a course of Dubois re-education in these cases rather than psycho-analysis. (*Cf.* MANIC-DEPRESSIVE INSANITY, *p.* 392 ; DEMENTIA PRÆCOX, *p.* 206.)

REFERENCES.—[1]*Psychoanal. Rev.* I, Nos. 1 to 4 ; [2]*Lancet*, 1914, i ; [3]*Psychoanal. Rev.* 1914, Nos. 2 and 3.

PUERPERAL FEVER. *Bryden Glendining, M.S., F.R.C.S.*

TREATMENT.—**Intravenous Injections of Magnesium Sulphate Solutions.**—Harras[1] collects fourteen cases in which this method of treatment has been employed. He does not regard it as specific, and thinks that ordinary treatment ought to be continued at the same time. He concludes that in limited quantity (about 400 c.c.) and in specified dilutions (2 per cent) the injections are quite harmless. The treatment is of more value administered early in the course of infection than after secondary localization has occurred ; it is of no benefit in chronic

thrombo-phlebitis or in pyæmia. The action appears to be chiefly upon the organisms circulating in the blood, as in streptococcæmia. In this latter it has reduced the mortality from 90 to 20 per cent—a most remarkable result; but it should be added that the lower death-rate refers only to five cases of streptococcæmia, four of which recovered.

REFERENCE.—[1]*Amer. Jour. Obst.* 1913, 825.

PUNA. (*See* MOUNTAIN SICKNESS.)

PURPURA. *Herbert French, M.D., F.R.C.P.*

Chronic or recurrent purpura, either of children or adults, is liable to be associated with various more or less severe *visceral lesions* from time to time, and a collected account of these has been given by Osler.[1] Some of these complications are due to actual hæmorrhages from or into the organs; others result from changes allied to purpura—angio-neurotic œdema for example. Cardiac complications are not common, though functional bruits are not infrequent. Amongst the respiratory complications may be mentioned recurrent attacks simulating asthma; recurrent bronchitis, bronchorrhœa; acute œdema of the upper respiratory passages, with stridor and threatened suffocation, which may even prove fatal.

The visceral lesions are of two types: (1) Mechanical, due to the presence of exudate in the walls of the stomach or intestine, effusion of blood on a mucous surface, or into the substance of an organ; (2) Inflammatory, as nephritis, less often endocarditis, pleurisy, pericarditis, pneumonia, or peritonitis. The cases have a dual etiology, infective and metabolic. Purpura, with or without erythema and exudative lesions, may follow gonorrhœa, otitis media, parturition, phimosis, and local lesions of the skin. The rheumatic poison is believed to be responsible for a large group; and in the case of a child with severe purpura in the third, and again in the fifth year, chorea in the sixth without endocarditis, severe urticaria in the same year with ill-health, chills, fever, and well-marked endocarditis, such a view is probably correct. The arthritis, too, is held to indicate the same cause, but it may have a very different explanation. Bacteriological examination has not been very satisfactory; no unanimity has been reached as to the organisms. On the other hand, there is a large group in which the lesions are an expression of perverted metabolism. Chronic angioneurotic œdema, urticaria, and some forms of purpura are possibly anaphylactic phenomena in persons sensitized for certain protein substances. It is interesting to note that experimental sensitization may be transmitted. Hay fever, the idiosyncrasy to iodine, quinine, to strawberries and shellfish, are all manifestations of this supersensitiveness. The phenomena of serum sickness reproduce in a graphic way the features of the skin diseases which the French group under erythema. The local œdemas, the urticaria, the purpura, the arthritis, the vomiting, and the persistence for years of the sensitiveness,

are paralleled by the lifelong liability to recurrence in some cases of angioneurotic œdema and of purpura.

The diverse localization, the variable character of the exudate, now serum alone, now blood, or blood and serum together, are points that await explanation. The actual exudate is conditioned by damage to the endothelial cells of the capillary wall by a circulating poison, as in experiments with snake venom. But it may only be some such subtle change in the blood-serum as takes place in the peripheral circulation in paroxysmal hæmoglobinæmia. In one patient, exposure to a temperature near the freezing point at once brought out a crop of urticaria on the face ; and a case of severe purpura following exposure to great heat has also been recorded.

Cerebral manifestations resolve themselves into two groups, the one with transient attacks of paresis, such as occur in Raynaud's disease and in arteriosclerosis ; the other in which the paralysis is due to coarse hæmorrhage. Osler gives details of cases such as the following : (1) Recurrent purpura for six years ; transient hemiplegia in an attack ; angioneurotic œdema of the hands, arms, and feet ; (2) Purpura hæmorrhagica with hemiplegia ; (3) Recurring epistaxis, purpura, hemiplegia, hæmorrhage into the brain ; (4) Attacks of purpura in the seventh year, with nausea and colic ; when sixteen, admitted with aphasia and right hemiplegia ; operation ; death. *Ocular* lesions include retinal hæmorrhages, ophthalmitis, iritis, detachment of the retina from hæmorrhage ; hæmorrhage from the conjunctiva.

To the *gastro-intestinal* symptoms, the most distressing though not the most dangerous of the visceral complications, the name of Henoch is given when associated with purpura, though they occur with any member of the erythema group of skin lesions. The manifestations may for years be abdominal without skin eruptions. *Colic* occurred in twenty-five out of twenty-nine cases. The attacks may be transient, lasting only a few minutes, but recurring several times during the course of the day. They may be of great severity, causing the patient to writhe in the bed. They occur most frequently at night. They are independent of diet, and occur with, or in the intervals of, the skin eruption. In protracted cases the colic may not appear for a couple of months, and then be very severe. The pain is usually central, and may radiate to all parts ; very often the child cannot fix upon the spot accurately. Osler has never met with an instance in which the pain was limited to the right iliac fossa. The abdomen is usually flat, not painful on pressure, without increase in the muscle tension, though it may often be difficult to palpate the child satisfactorily. There may be marked tenderness along the transverse colon. *Vomiting*, with or without pain, is perhaps quite as frequent as colic, with which it is very often associated. If the child has eaten recently, the food is vomited with mucus and watery fluid and, if the vomiting is very severe, flakes of blood. It may be frequent, without pain, and there are remarkable gastric crises in which the patient has fever and delirium with the colic and vomiting. Hæmatemesis is common

enough in severe types of purpura. It may also occur in connection with colic in milder forms which have no extensive cutaneous hæmorrhages or bleeding from other mucous surfaces. *Diarrhœa* is not nearly so common as vomiting, but may take the form of increased frequency of the stools, either lienteric or watery, three to six in the day, with blood and mucus. With severe purpura the blood may be in large amount, colouring the entire stool, and very little changed. In the ordinary cases with colic, the stools contain mucus streaked with blood. In connection with the diagnosis, the colic, the frequency of the stools, and the blood may be highly suggestive of intussusception, for which, indeed, operation has been performed.

The conditions under which the gastro-intestinal crises occur may be summarized as follows: (1) Cases without skin lesions. (2) In association with hæmophilia—in this disease, as is well known, it is not simply a matter of bleeding from accidental blows or cuts, but there are also spontaneous hæmorrhages, cutaneous, arthritic, and visceral. (3) With ordinary urticaria. (4) Angioneurotic œdema. In the ordinary forms in which there is transient œdema of the eyelid, or of the forehead, or of one hand, there is not often colic; but in the severer varieties the gastro-intestinal crises may be a special feature. It is apparently very common in the family form. The abdominal attacks may occur alone, or with very slight swelling. (5) The largest group, in which the gastro-intestinal symptoms occur in connection with simple purpura with or without urticaria. These attacks should not be mistaken for appendicitis. Osler has known at least five cases admitted to surgical wards, and many instances of operation for appendicitis have been reported in the literature. The condition found has been local infiltration of the bowel wall with blood or serum. In the majority of cases the ileum was involved. In one recorded case the appendix was infiltrated with hæmorrhagic œdema. (6) Intussusception may complicate abdominal purpura or angioneurotic œdema. Without the characteristic sausage-shaped tumour the diagnosis is difficult, as the frequent small stools of blood and mucus—often indeed, large amounts of blood—are not uncommon features in abdominal purpura. If examination is difficult, an anæsthetic should be given in a doubtful case. It should also be remembered that a palpable tumour may be caused by a massive exudate into the bowel wall itself, by a clot in the lumen of the bowel, or by a massive hæmorrhage into the mesentery.

The *renal* cases may be the most serious of all. They fall into three groups: (1) Those which run an acute course, with dropsy, and death in uræmia within three months. Two cases of Osler's resembled ordinary severe nephritis with dropsy; death occurred in both within twelve weeks of the onset. (2) The albumin disappears, and the patients get perfectly well. There were ten of such in the series. It may be several months before the albumin disappears. The general health may be excellent, while the urine shows a large amount of albumin and many tube casts. (3) In a small number of cases the

nephritis becomes chronic, and sometimes albumin and casts may persist for months. The danger is the gradual development of a progressive nephritis, with the usual secondary cardiovascular changes. The anatomical lesions of this type of nephritis with purpura have not been much studied. The condition found in one fatal case was an adhesive glomerulonephritis, in which, with great proliferation of the epithelium, there was also a new growth of connective tissue within the capsules. Clinically there are several features of great interest in this type of nephritis ; long after all signs of cutaneous symptoms have disappeared, hæmaturia may persist for months, just enough perhaps to tinge the urine. The albumin is unusually abundant, thick, and curdy. With large amounts of blood and albumin, tube casts may be absent and scanty. Dropsy may be absent even when the nephritis has persisted for months ; and for months after the patient has recovered his usual health, albumin may persist in large amount.

The diagnosis of the nephritis associated with the skin rashes of the erythema group is, as a rule, easy ; but it must be borne in mind that œdema may not be present, and that the nephritis may persist long after the cutaneous symptoms have disappeared. The combination of nephritis with a skin rash in which the erythema predominates, may lead to the diagnosis of scarlet fever. It is also to be remembered that purpura is by no means an uncommon complication of chronic interstitial nephritis. One is sometimes deceived, as, in the young, chronic interstitial nephritis is consistent with excellent health, and the patient may be admitted with the features of ordinary Henoch's purpura.

Reference.—[1]*Brit. Med. Jour.* 1914, i, 517.

E. Graham Little, M.D., F.R.C.P.

Cases of purpura ending fatally are sufficiently uncommon to deserve attention when they occur, and Taylor[1] contributes a well-reported instance. The patient was a boy, age 12 years. The illness began with an acute attack of tonsillitis, followed by an eruption of papular lesions of purpura on the extensor surfaces of feet and arms, and severe abdominal pain, with subsequent symptoms of collapse. Blood was passed copiously by the rectum and in the urine. He recovered from this attack, and was discharged from hospital free from any hæmorrhage. Just a year later he was admitted again with an attack precisely similar to the one recorded, beginning as before with a tonsillitis, and with the addition of vomiting and diarrhœa. He became progressively worse, and died in a semi-comatose state which came on several days before death. Pyrexia throughout the illness was moderate. Blood cultures remained sterile after three days' incubation at 37° C. under aerobic and anaerobic conditions. The autopsy showed numerous hæmorrhages in the viscera as well as the skin. The condition of the suprarenals is not noted.

The treatment, besides retention in bed and other general measures, included administration of several drugs in turn, salol, beta-naphthol,

polyvalent antistreptococcic serum, calcium lactate, oil of turpentine, and pituitary extract, all being tried, but without apparently exerting the smallest benefit.

REFERENCE.—[1]*Brit. Jour. Derm.* 1914, 392.

PYELOGRAPHY. *J. W. Thomson Walker, M.B., F.R.C.S.*

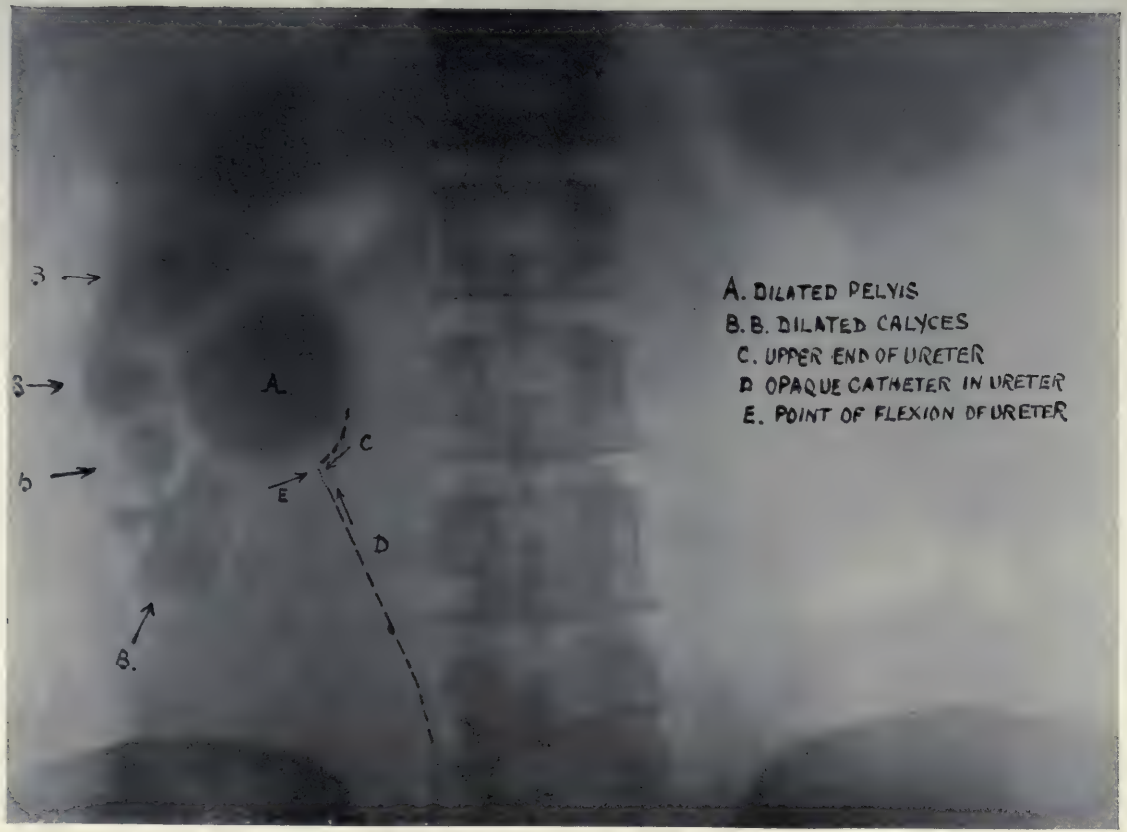
In the MEDICAL ANNUAL of 1912 (p. 363) this method of diagnosis was shortly described. During the past year a number of articles on pyelography have appeared, and a review of the method and its use is of practical interest. In an article discussing the application of the method, and another reviewing the whole subject, the present writer[1] gives references to all the main contributions on this subject. It is therefore unnecessary to do more than note the recent articles of Casper,[2] Fowler,[3] Harris,[4] Joseph,[5] Ironside Bruce,[6] and Willan,[7] describing the method and its use, and those of Eisendrath,[8] Keene and Pancoast,[9] Mason,[10] and of Vest,[11] dealing with the dangers which follow its application.

Pyelography consists in obtaining an *x*-ray shadow of the renal pelvis and calices which have been filled with an opaque fluid. The examination is made in the radiographer's room. The patient lies on the radiographic couch, and cystoscopy is performed in the usual way with a catheterizing cystoscope. A catheter opaque to the *x* rays is passed into one or both ureters, and through this the opaque medium is introduced into the renal pelvis. The catheter should, if possible, be passed into the renal pelvis, but various causes may prevent its passing the full length of the ureter. In this case it will be found that so long as there is no regurgitation into the bladder, from the eye of the catheter being too close to the ureteric meatus, the fluid will ascend the ureter and fill the renal pelvis. When the catheter is in position the cystoscope is withdrawn, and the collargol, previously warmed, is introduced. A syringe has been used by some surgeons for this purpose, but hydrostatic pressure with a very small head of fluid is much safer, as it does not cause over-distention of the pelvis. The following simple method is used by the writer: The collargol is drawn into the barrel of an all-glass syringe of 20 c.c. capacity, and the needle attached and inserted into the end of the ureteric catheter. The glass piston of the syringe is allowed to remain in the barrel, but is not used for the purpose of injecting the fluid. The syringe is now raised vertically to about 6 or 8 in., and by the light of a small electric lamp held behind it, the column of fluid is seen to fall.

Two signs indicate that the renal pelvis is full and the introduction must cease, namely: (1) Pain in the renal pelvis; and (2) Hesitation and finally cessation in the descent of the column of fluid in the syringe. The amount of pain varies greatly. It is found to diminish in proportion to the previous dilatation of the renal pelvis as a result of obstruction, and may be entirely absent in quite normal individuals. It should never amount to colic, which is due to too rapid

PLATE XLVII.

PYELOGRAPHY



Pyelography in hydronephrosis due to aberrant renal vessels. Plate marked to show position of obstruction.

filling, too great distention, too cold or too hot solution. According to Keene and Pancoast, severe pain is the result of trauma of the renal pelvis and kidney caused by the ureteric catheter, and it is greatly diminished by passing the catheter only part way up the ureter. Tennant[12] holds that pain indicates the passage of collargol into the kidney tubules in many instances, and is not merely a colic due to an over-distended pelvis.

When the pelvis is filled, the catheter is plugged and the exposure to the *x* rays made without any delay. When the radiogram is taken, the fluid is allowed to run off, the renal pelvis gently washed with saline solution, and the catheter removed. It is important that no general or local anæsthetic should be used to prevent pain in the renal pelvis, for in this way an important guide would be lost. The solution most suitable for use is collargol in 5 or 10 per cent strength. The writer has used 15 and 20 per cent solutions without ill effect.

The following are the applications of the method in practical surgery :—

1. *Early Diagnosis of Dilatation of the Kidney.*—In hydronephrosis due to calculus or to movable kidney, the method is chiefly useful in clearly demonstrating commencing dilatation, and the necessity of operation without delay. In the early stage of hydronephrosis due to congenital stenosis or valve formation at the uretero-pelvic junction, or the pressure of an aberrant renal vessel, pyelography demonstrates the presence of dilatation of the renal pelvis, long before any enlargement of the kidney can be detected by palpation (*Plate XLVII*). There is also a class of cases where, for one reason or another, a diagnosis of hydronephrosis has been made, and pyelography can demonstrate that no dilatation of the kidney is present (*Fig. A, Plate XLVIII*).

2. *The Diagnosis of Renal Growths.*—According to Braasch,[13] pyelography is an important aid in the diagnosis of renal growths. This observer states that in over 75 per cent of the kidneys operated on for malignant renal tumour at the Mayo clinic, the pelvis was found involved in a varying degree. Pyelography will demonstrate an abnormality in the pelvic outline in such cases. The variation from the normal must be considerable before conclusions can be drawn. In 22 cases with operation in which pyelography was employed, recognizable deformity was demonstrated in 17. Braasch regarded the method as particularly valuable in identifying renal tumours which are unaccompanied by urinary symptoms, and in which urinalysis is found negative. Kidd[14] held that the method was useful in cases of unilateral renal hæmaturia unaccompanied by other symptoms. Thomson Walker[15] said that the number of cases where renal growth was present without urinary symptoms was very small. In such cases pyelography would undoubtedly be of service; partly no doubt from the demonstration of distortion of the pelvis, but much more from the identification of the renal tumour as being renal in

origin, or by the demonstration of a normal pelvis situated at some distance from the tumour, which excludes a renal growth. The discovery of a peculiar distorted shadow of the renal pelvis cannot be accepted, without other evidence, as proof of the presence of a renal growth. Bizarre appearances of the pelvic shadow are produced by the partial escape of collargol from the normal renal pelvis, so that a partly filled pelvis is photographed. When a tumour and hæmaturia appeared together, as in the majority of cases, the employment of pyelography appears to be a needless infliction on the patient. In cases of unilateral renal hæmaturia without tumour or other signs, the kidney should be explored for growth, whether the renal pelvis is normal or abnormal as shown by pyelography.

3. *The Localization of Supposed Stone Shadow in the Kidney Area.*—There are two groups of cases. In the first, a shadow which falls within the area of the renal shadow may be found to be extrarenal. Calculi lie either in the pelvis of the kidney or in one of the calices, and if it can be demonstrated that the supposed stone shadow lies at a distance from the pelvis and calices, it can be considered extrarenal. This gives useful information in some cases of opaque gall-stone (*Figs. A, B, Plate XLIX*). In the second group, pyelography is used to localize accurately a stone shadow in the kidney, and enable the operator to cut directly on the stone. It is possible to localize with fair accuracy a stone shadow, from its relation to the kidney shadow, and further, small stones move freely from one part of the kidney and pelvis to another, and are often found at operation to lie at a different spot from that shown by the *x* rays.

4. *The Diagnosis of Abdominal Tumours.*—Where there is nothing sufficiently characteristic in the tumour itself, and no localizing symptoms such as jaundice, leucocytosis, or hæmaturia, which would give a clue to the organ affected, pyelography is of service in demonstrating the position of the renal pelvis and calices and their relation to the abdominal tumour. Such abdominal tumours as hydatid cysts, distended gall-bladder, perirenal growths, and masses of abdominal glands have been demonstrated in this way to be extrarenal (*Fig. B, Plate XLVIII*).

Failures and Dangers of Pyelography.—The most frequent cause of failure is due to the collargol solution escaping down the ureter alongside the catheter, and the pelvis being emptied before the radiogram is taken. This is due to delay between the time of filling the pelvis and taking the radiograms.

Cases have been recorded where a fatal result has followed the use of pyelography. In one case (Roessle) there was "cauterization of the entire mucous membrane of the renal pelvis and destruction of the pyramids." No further examples of this have been published, and it is practically certain that the collargol had nothing at all to do with this condition. In two fatal cases the renal pelvis or kidney was ruptured and the perirenal tissue injected with collargol. Oehlecker's patient was a child, age 10, in whom the renal pelvis was

ruptured, and the kidney and perirenal tissue injected with collargol solution. It was stated here that the fluid was "injected under high pressure." The second example of rupture of the kidney was reported by von Hofmann[16] in the case of a girl of 15 years with hydronephrosis. The hydronephrotic sac was ruptured and the solution entered the peritoneal cavity.

A third condition which has been recorded a number of times, is the entrance of the collargol solution into the renal tubules. This varies greatly in degree. In its less pronounced form there is infiltration of the kidney substance with collargol, and in the more severe form there are one or several wedge-shaped infarcts of collargol-filled tubules, with necrosis in some cases. In most cases the collargol has travelled along the lumen of the tubules, and in others it was found in the interstitial tissue outside the tubules. Tennant relates an example of a wedge-shaped infarct caused by collargol injection found on operation two weeks after pyelography. The wedge was incised, the tubules and glomeruli were found to be filled with collargol, the tubular epithelium was necrotic, and in some parts the tubules were broken down, the collargol diffused, and the interstitial tissue degenerated. Two similar cases are described by Mason, who also quotes one observed by Mallory. Braasch states that Buerger has recorded cases where deposits of silver with surrounding foci of suppuration were found in the cortex of a kidney removed after pyelography, and states that three similar cases have occurred in the Mayo clinic. Vest states that at operation, collargol was found in five cases in the kidney and perirenal tissues, and in one case in the peritoneal cavity. The discoloration in one case extended throughout the entire retroperitoneal space on the side injected. Pain lasting two or three days or even ten days, was observed, and there was a rise of temperature in two cases to 102° and in one to 104°.

A fourth condition that has been found is œdema of the perirenal and occasionally the peri-ureteral tissues. Kelly described two cases, and others have been noted. Cases have been recorded by Vest and others where fever followed the injection and persisted for several days, and occasionally resulted in perirenal suppuration. This is the result of infection carried in with the catheter, and is not the direct effect of the collargol.

There are two important questions involved in these untoward results of the use of pyelography: (1) Does collargol solution cause irritation of the kidney epithelium, the kidney pelvis, or ureters? (2) What is the cause of the injection of tubules in some cases, and can it be prevented? In some of the cases of invasion of the kidney tubules, the renal epithelium has been said to be injured or destroyed. Judging from the descriptions, it appears as if a very extensive invasion of the tubules, such as is seen in the wedge-shaped infarcts, causes necrosis of the renal epithelium, while the invasion of a few tubules has little effect. The strength of the solution, supposed by some observers to be an important factor, has varied with different

observers, the usual strength being 5 per cent. Braasch uses 10 or 15 per cent, Vest 15 per cent, and the writer works with 15 to 20 per cent. Tennant used 25 per cent. The stronger solutions do not appear to have caused greater irritation than the more dilute. The collargol solution has little or no effect on the mucous membrane of the renal pelvis, which is found healthy and glistening when the collargol solution has remained there for a week. Examination of the urine after pyelography has shown, according to Kidd, Vest, and others, albumin, leucocytes, red blood corpuscles and granular casts for some days. In a short time these elements disappeared and the urine became normal. It appears, therefore, that whatever damage may be caused by the minor degrees of injection of the renal tubules by collargol, the effect is not permanent. In the search for other opaque non-irritating fluids, Uhle, Pfahler, Mackenney and Miller[17] tried silver iodide emulsion (5 per cent), novargan (10 per cent), collargum (2 to 10 per cent), silver nitrate (1 per cent), and colloidal silver oxide (5 to 50 per cent). They obtained good results with the latter. Kelly[18] recommended iodide of silver emulsion (5 per cent) in mucilage of quince seed, as being cleaner, of known strength, non-irritating, antiseptic, and more dense than collargol.

The passage of the fluid into the renal tubules is undoubtedly due to overfilling of the pelvis. This has been found by experiments on human kidneys and those of sheep, pigs, and other animals after removal (Wossidlo,[19] Eisendrath). The three important factors in producing injection of the tubules are: (1) The intrapelvic pressure; (2) The duration of the pelvic distention; and (3) Damage to the kidney by the ureteral catheter. The type of disease of the kidney for which the examination is made appears to have some influence in producing infiltration of the tubules. Keene and Pancoast point out that the recorded cases where extensive changes were produced by collargol were three of hypernephroma, one of pyonephrosis, and one of suppurative pyelonephritis. These authors also report one case of renal tuberculosis and one of chronic pyelonephritis and hydronephrosis. This, according to these writers, "is sufficient evidence to indicate that such lesions may act as at least contributing factors in the dissemination of collargol throughout the kidney, since they furnish ideal conditions for the production of a portal of entrance."

The guides to the surgeon in introducing the fluid are the pain of pelvic distention and the cessation of the fall of fluid in the receptacle. No anæsthetic must be used to deaden the pain, and the fluid column should be very carefully watched. Pelvic distention pain is frequently absent in normal individuals, and it diminishes with increasing dilatation in hydronephrosis. Thomas[20] used a mercury manometer to gauge the pressure. There is, however, no standard pressure safe in every case, and no standard capacity of the renal pelvis, so that such an apparatus gives a false sense of security. Careful watching of the fall of the column of fluid, the use of small-size

ureteric catheters which do not completely block the lumen of the ureter, and, above all, the greatest gentleness in manipulation, are the best means of obtaining safety in practising this method.

REFERENCES.—[1]*Ann. Surg.* 1913, ii, 766, and *Brit. Jour. Surg.* 1914, July, 128 ; [2]*Berl. klin. Woch.* 1914, 1259 ; [3]*Jour. Amer. Med. Assoc.* 1914, i, 367 ; [4]*Med. Jour. of Austral.* 1914, July, 33 ; [5]*Berl. klin. Woch.* 1914, 1253 ; [6]*Brit. Med. Jour.* 1913, ii, 918 ; [7]*Lancet*, 1914, i, 233 ; [8]*Jour. Amer. Med. Assoc.* 1914, i, 1392 ; [9]*Ibid.* ii, 523 ; [10]*Ibid.* i, 839 ; [11]*Johns Hop. Hosp. Bull.* 1914, 74 ; [12]*Ann. Surg.* 1913, lvii. 888 ; [13]*Jour. Amer. Med. Assoc.* 1913, lx, 274 ; [14]*Proc. Roy. Soc. Med.* (*Surg. Sect.*), 1913, vii, 16 ; [15]*Ibid.* vii, 59 ; [16]*Folia Urologica*, 1914, viii, 393 ; [17]*Ann. Surg.* 1910, li, 546 ; [18]*Surg. Gyn. and Obst.* 1913, xvi, 707 ; [19]*Arch. klin. Chir.* ciii, No. 1 and 2 ; [20]*Jour. Amer. Med. Assoc.* 1913, lx, 184.

PYLORUS, CONGENITAL STENOSIS OF.

Frederick Langmead, M.D., F.R.C.P.

ETIOLOGY.—Since many practitioners base their treatment on the views which they hold of the cause of this condition, it is unfortunate that the etiology is still unsettled. By some it is regarded as a congenital abnormality, by others as the result of pyloric spasm, and by others again as resulting from a combination of these two. C. L. Scudder[1] thus formulates his reasons for believing that the condition is a congenital anomaly : (1) Since the earliest indication of the presence of a pylorus is in the third month of fœtal life, there is ample time for the growth of the hypertrophied muscle to take place ; (2) A case has been recorded by Dent of a seven months old fœtus with a pyloric tumour showing the same structure as that found in cases of hypertrophic stenosis ; (3) The symptoms appear so soon after birth that it is impossible to conceive the overgrowth of muscle could take place between birth and their onset ; (4) The condition is occasionally associated with other congenital defects ; and (5) Aberrant Brunner's glands have been found in the pyloric tumour. On the other hand, those who favour the theory of pyloric spasm cite the facts that vomiting does not usually begin until about the tenth day, and that other congenital defects are but rarely found to support their contention. The clinical course of the illness, the variability of the symptoms, and the undoubted cases of complete recovery are the strongest evidences that the obstruction is something more than a merely anatomical one. To explain this difficulty, many authors believe that another condition exists, distinct from but somewhat resembling hypertrophic stenosis, to which they have given the name ' pyloric spasm.'

An enquiry into the literature shows that the distinctions drawn by different authors between the two conditions are not always the same. According to Scudder, the symptoms of pylorospasm begin several weeks after birth, the stools contain fæcal material, the pyloric tumour is either not felt at all or only when gastric contraction occurs, and the vomiting lacks the characteristics of that of pyloric stenosis. [These distinctions, however, cannot be regarded as satisfactory, for all or any of them may be seen in cases where, after death,

stenosis has indubitably been found. Absolute obstruction is the exception, and fæcal matter is almost always present in the stools.—F. L.]

C. G. Mixter[2] states that a pyloric tumour is not present in pylorospasm, and that peristalsis but rarely occurs; others hold that one or the other, or both, are frequently demonstrable in pylorospasm, and distinguish it from true stenosis merely by the fact that recovery may follow purely medical treatment. Ruhräh[3] bases his diagnosis chiefly on this point, but acknowledges that there are gradations between the two classes, the congenital form being perhaps associated with a considerable amount of spasm, and continuous spasm perhaps producing hypertrophy of the pyloric muscle.

It is clear, then, that those who believe in pyloroplasm as a clinical entity are not agreed as to the means of distinguishing it from true hypertrophic stenosis, and the present writer is in agreement with Holt,[4] in whose opinion it would be well if the term 'pylorospasm,' as defining a special group of cases, were omitted from the nomenclature.

DESCRIPTION OF PLATE L.

Fig. A.—Before operation, J. McK. One hour and ten minutes after meal. Strong peristaltic contractions. Bismuth to left of median line.

Fig. B.—Three hours and thirty minutes after meal. Outline of stomach shown by bismuth clinging to mucous membrane.

Fig. C.—Five hours after meal. Marked balling—large air-space—no bismuth in intestine.

Fig. D.—After operation—nine months—A. G. Immediately after feeding.

Fig. E.—Fifteen minutes after bismuth. No bismuth passing through pylorus.

Fig. F.—One hour after bismuth. Stomach emptying through gastro-enterostomy opening.

As he says, "definite persistent spasm of the pylorus, without hypertrophy, has yet to be proved." When the classical symptoms of vomiting from early life, constipation, and wasting though the appetite is retained are accompanied by definite peristalsis, hypertrophic stenosis of the pylorus is always found after death—if the case proves fatal—whether a pyloric tumour could be felt or not. As Holt says, the real question is whether or not there exists an obstruction sufficient to endanger the child's life, and how best it may be relieved. A better division is into mild and severe cases. The two elements, the spasmodic and the hypertrophic, are probably present in every case, sometimes one and sometimes the other predominating. The essential difference between the two groups is one of degree rather than of kind.

DIAGNOSIS.—If pylorospasm is not recognized as a separate condition, the diagnosis of hypertrophic stenosis is not difficult. Vomiting begins within the first weeks of life, generally about the tenth day; it is explosive and cumulative in character, and uninfluenced by slight changes in diet. Constipation necessarily ensues, because of the small

Fig. A.

Fig. B.

Fig. C.

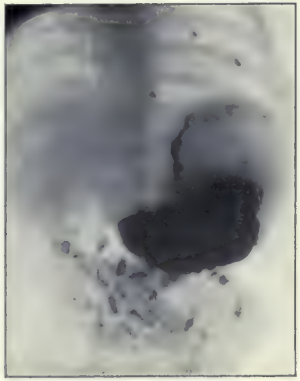


Fig. D.

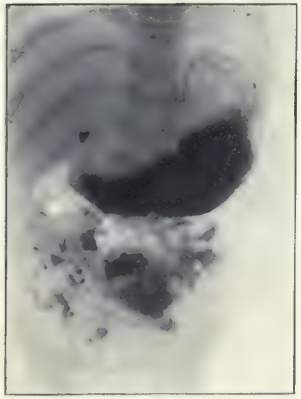


Fig. E.

Fig. F.

Illustrations kindly lent by the Boston Medical and Surgical Journal

amount of food which reaches the intestine. There is a steady loss of weight. In spite of this the child is unexpectedly vigorous and happy, denoting an absence of toxæmia. Examination of the abdomen reveals the characteristic gastric peristalsis, sweeping across the upper part of the abdomen from the left hypochondrium to the right of the epigastrium. A pyloric tumour may or may not be felt. Unless one of these two abdominal signs is detected, the diagnosis cannot be made with certainty, but they should be repeatedly looked for if the other features of the case suggest this disease. Often they may be brought into prominence by feeding the patient, and examining him directly afterwards. It must be borne in mind that diarrhœa sometimes arises as a complication, especially after the child has become greatly enfeebled. The chief features which have been held to distinguish pylorospasm are: a later onset of the vomiting; more indefinite, or absent, peristalsis; less obstruction of the pylorus, as shown by larger stools; absence of a pyloric tumour; and more amenability to medical treatment.

As stated above, each believer in pylorospasm has his own view of the manner in which it is distinguished from hypertrophic stenosis. Recently *x* rays have been utilized as a means of diagnosis (*Plate L*). C. G. Mixter, who recognizes pyloroplasm, says that a radiogram shows no sharp difference between the two conditions, but that in both there is a wide departure from the normal. Directly after ingestion the stomach is shown distended, the bismuth evenly distributed, and the pyloric end of the bismuth mass outlined in a prow-like rounded form. Later, bismuth begins to appear in minute dark patches in the small intestine, the amount passing the pylorus depending on the degree of obstruction. The bismuth, which at first filled the stomach, the pyloric end of it being well to the right of the mid-line, gradually assumes the form of a dense ball-like mass at the most dependent position of the greater curvature, near the median line, generally slightly to the left. The stomach is still distended, its outline being marked by the particles of bismuth clinging to the mucous membrane. Between its walls and the central mass is a wide air-space, except where the bismuth lies in contact with the greater curvature. The pyloric end retains its prow-like appearance. This condition will remain unchanged for several hours. The difference between the radiogram of true stenosis and that of cases which are classed as pylorospasm is slight. At first the two are identical. Later, when the bismuth becomes ball-shaped, the exaggerated type of peristalsis is evident in stenosis, whilst it is absent in spasm. He raises the question whether the two classes of cases do not merge into one another.

H. M. Richter[5] says that the use of Röntgen rays should be limited to determining the rate of emptying of the stomach, not the patency of the pylorus, as stenosis cannot be excluded by evidence that bismuth passes the pylorus. [This warning would hardly be necessary if it were more generally recognized that the stenosis is not an absolute one. —F. L.]

J. L. Morse[6] finds radiograms of great value in the diagnosis of this condition, but Holt, on the other hand, says that they may be quite misleading. Bismuth may pass out of the stomach, as may food, through an exceedingly narrow opening, and yet the symptoms may be of an aggravated type. The method can only show the rate of discharge from the stomach, and to gauge this he prefers aspiration: a measured quantity of non-coagulating food is given, and the contents of the stomach are removed after three hours. Determination of the amount of food retained in the stomach is especially valuable in those cases where vomiting is infrequent, and as a means of estimating the progress of a case.

Treatment.—Authorities are still at variance. Some surgeons hold that operative treatment is essential, some physicians never advise it. Happily the majority avail themselves of both medical and surgical measures in suitable cases. Some of those who consider operation essential in every case appear to base their contention on two hypotheses—one, that the obstruction is a malformation, which is contestable; the other, that it is complete, which is incorrect. The view of those who always operate seems to the majority as unreasonable as that of physicians who never invoke surgical aid, or only when the patient's resistance has been reduced to a minimum.

Medical.—Holt records a series of 57 cases, with 26 recoveries and 31 deaths, a mortality of 55 per cent; 28 patients were operated upon, with 14 deaths; 29 were treated medically, 17 died. It should be remembered, however, that three-fourths were hospital cases, that many were hopeless from the beginning, and that four were practically moribund. He has been able to trace 7 patients who recovered from their symptoms under purely medical treatment. The recovery appeared to have been complete in each case, and in none did the symptoms persist into childhood. Operation, he thinks, should be done,not because a case is classed as spasmodic or as hypertrophic, but because obstruction of a dangerous degree exists, whatever its suspected nature. The medical treatment which he advises is careful **Feeding** and **Stomach Washing.** The gastric lavage should be practised twice a day, the water used being at a temperature of 112° F. Breast milk is the best food, but should not be rich in fat. In default of breast milk, a modified mixture with a low fat content should be employed. In greatly prostrated patients **Hypodermoclysis** may be employed twice a day. He uses normal saline with 4 per cent dextrose, 100 to 200 c.c. of which are slowly introduced either between the shoulders or into the abdominal walls. He advocates the same measure after operation. Neither to drugs nor to local applications of heat does he ascribe any value. Every case must be closely watched, and daily weights taken. **Aspiration of the Stomach** gives great assistance in deciding the frequency and amount of the feeds.

Ruhräh insists on the necessity of the use of **Breast Milk,** and the superiority of **Atropine** to other forms of medication. He administers $\frac{1}{2000}$ gr. of the latter at intervals of from four to six hours, and if no

therapeutic effect is obtained, he advises that the dose should be cautiously increased until the first symptoms of the drug are noticed. He found **Rectal Administration of Plain Water** or **Salt Solution** of the greatest benefit in relieving thirst and stimulating the excretion of urine. He is doubtful of the advantage of counter-irritation over the epigastrium.

Surgical.—Several encouraging series of cases treated by surgical means have recently been published. C. L. Scudder gives details of 17 cases under his own care, 14 of which recovered. The operation performed was that of posterior gastro-enterostomy. Rowland Hill[7] records 10 cases, 5 of whom recovered and 5 died. Posterior gastro-enterostomy was performed in 9 and divulsion of the pylorus in the tenth, which proved fatal. J. W. Keefe[8] prefers pyloroplasty to gastro-enterostomy, and records 8 cases treated by this means; 6 of these recovered and 2 died. He thinks that pyloroplasty, either alone, or combined with the passage of smooth sounds through an opening in the stomach and the lumen of the pylorus, will ultimately be the operation of choice. W. A. Downes[9] reports 22 cases, of which 7 died. In his opinion gastro-enterostomy is the best operation, and partial pyloroplasty should be reserved for those cases in which haste is the first consideration. H. M. Richter also records 22 cases: 19 of the operations performed were typical gastro-enterostomies, and in 2 cases the patients died; on 2 a submucous pyloroplasty was performed, with one death; and 1 was a divulsion of the pylorus. This makes a total of 3 deaths, which he attributes in two cases to faulty technique, and in the third to the feeble condition of the patient. Two of the seventeen cases which recovered from the operation of gastro-enterostomy developed sequelæ necessitating re-opening of the abdomen.

REFERENCES.—[1]*Ann. Surg.* 1914, i, 239; [2]*Boston Med. and Surg. Jour.* 1913, ii, 309; [3]*Amer. Jour. Med. Sci.* 1914, i, 474; [4]*Jour. Amer. Med. Assoc.* 1914, i, 2014; [5]*Ibid.* 353: [6]*Ibid.* 1913, ii, 1422; [7]*Surg. Gyn. and Obst.* 1914, i, 616; [8]*Amer. Jour. Obst.* 1913, 957; [9]*Jour. Amer. Med. Assoc.* 1914, i, 2019.

PYOSIS TROPICA. *Sir Leonard Rogers, M.D., F.R.C.P.*

A. J. Chalmers and W. R. O'Farrell[1] describe a non-follicular staphylococcal skin disease in the Sudan, which they follow Castellani in calling by the above name. They illustrate a case in which a **Vaccine** treatment rapidly cured.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1913, 377.

RAT-BITE FEVER. *Herbert French, M.D., F.R.C.P.*

Surveyor[1] speaks favourably of the use of **Neosalvarsan** in the treatment of rat-bite fever. In a severe case under his own care, as the patient's condition was getting worse and worse, he decided to try an intramuscular injection of neosalvarsan, of which 0·7 gram was given when the temperature was 99° F. For about a week the temperature varied between 99° and 102°, and there was severe pain at

the site of the injection, which was moderately swollen. After that, the temperature came down to normal and remained so for a fortnight, as it is apt to do in rat-bite fever, and then rose again, but for two days only, and not above 100° ; after this attack the roseolar eruption was very slight in comparison with what it had been in the previous pyrexial bouts. A month later there was a further slight rise of temperature for a short time, since when the patient has remained apparently cured. (*See also* MEDICAL ANNUAL, 1913, *p.* 38.)

REFERENCE.—[1]*Lancet*, 1913, ii, 1764.

RECTUM, CANCER OF. *Sir Charles Bent Ball, Bart., M.Ch., F.R.C.S.*

Reduction of Shock in Excision of the Rectum by Blocking the Sympathetic Nerves.—Lynch[1] objects to the usual form of spinal anæsthesia in these cases, mainly because of the different positions in which the patient has to be placed in order to complete the operation with comfort. He proceeds as follows : $\frac{1}{4}$ gr. morphia and $\frac{1}{200}$ gr. hyoscine are administered subcutaneously ; a hypodermic needle is introduced into the sacral canal by passing it below the last spinous process of the sacrum, or if this cannot readily be felt, by passing the needle down to the bone in the middle line above the coccygeal joint and upwards, still close to the bone, until it enters the canal ; limitation of lateral motion of the needle indicates that the point has entered the sacral canal. Four c.c. of 1–500 sterile solution of cocaine are injected on each side of the canal, and if anæsthesia is not complete at the end of fifteen minutes, 1 to 2 c.c. more may be introduced, the needle being retained *in situ* for this purpose.

The abdomen having been opened, a small opening is made in the peritoneum just above the bifurcation of the aorta, and by means of a blunt-pointed hypodermic needle, the triangular space between the two common iliac arteries is infiltrated with a 1 per cent solution of novocain. Some is also infiltrated between the layers of the pelvic mesocolon. Excision of the rectum can now be undertaken by the combined method. It is claimed that this preliminary blocking of the nerve trunks materially diminishes the shock of the operation.

Antiseptic Preparation of Rectum for Operation.—In an interesting paper by Frank E. Taylor,[2] the question of intestinal disinfection in alimentary toxæmia is fully detailed. He shows that intestinal bacteria and their products may be dealt with in two ways by means of substances introduced through the mouth. One of these is associated with the name of Metchnikoff and his school, namely, the replacement of the putrefactive organisms in the gut by harmless lactic acid bacilli of the type of the *Bacillus bulgaricus* of Massol and the *Streptococcus lactis* of Kruse. This is the rationale of the soured-milk treatment which has become so popular. Unfortunately, as Dr. Ledingham points out, " a bacteriological basis for the view that the activity of lactic acid bacilli inhibits that of the putrefactive organisms is still lacking." The other method consists in an attempt to diminish the content of putrefactive and other bacteria within

the intestinal tract by drugs. Complete sterilization of the intestine is as undesirable as it is impracticable.

The question as to whether the germ content of the intestinal canal can be modified by the administration of bactericidal substances by the mouth without causing undesirable toxic effects is one which has been much disputed, and upon which there is little uniformity of opinion, even at the present time. Stern many years ago administered antiseptics to patients suffering from various diseases, followed by a dose of *Bacillus prodigiosus* culture, the stools being plated at various intervals, and the number of colonies of *B. prodigiosus* which developed noted. After the administration of salol and of naphthalin in doses of 1 gram, of β-naphthol in 0·5-gram doses, and camphor in 0·1-gram doses, very numerous colonies of *B. prodigiosus* developed. Only after the administration of calomel in large doses was there a scanty development of *B. prodigiosus* colonies.

In these experiments, then, salol, naphthalin, β-naphthol, and camphor were found useless as intestinal disinfectants. The only tested substance which exerted a definite effect was calomel in large doses, which, because of its purgative effects and its toxicity, is obviously quite unsuitable as a routine intestinal disinfectant.

The problem was attacked in another way with newer germicidal substances in the bacteriological laboratories of King's College in a series of experiments, to be published later, by Professor Hewlett. The number of *B. coli* in the stools of two normal adults was found to average about ten millions per gram. To one of these individuals was given one gelatin-coated capsule, containing 3 min. of **Kerol** (an emulsified disinfectant of high carbolic-acid coefficient and low toxicity containing a di-phenyl nucleus) three times a day after meals, the other individual taking 10 gr. of salol thrice daily in a similar manner. At the end of three days there was no appreciable alteration in the *B. coli* content in the stools of either individual. The kerol was now increased to two 3-min. capsules thrice daily, the salol remaining as before. The number of *B. coli* in the stools of the kerol-taking individual rapidly dropped to about ten thousand per gram, that of the salol-taking individual remaining as before at about ten millions. These results have been confirmed by experiments performed elsewhere, the *B. coli* content of the stools having been reduced by 99 per cent by the administration of two 3-min. capsules thrice daily after meals. These results were obtained upon healthy adults taking a normal amount of food ; the same results would doubtless be obtained with smaller doses in invalids on smaller and more restricted diets. Bacteriological experiments have thus shown that the oral administration of suitable disinfectants does diminish the bacterial contents of the intestine.

In operations involving the rectum, especially above the pelvic diaphragm, such as excision, sepsis is still a very grave danger. It appears that the above researches into means of preventing excessive putrefaction within the intestine for the purpose of limiting intestinal

toxæmia, indicate an important method of preliminary preparation for serious operations on the rectum and colon generally. Our predecessors taught us that a mercurial purge followed by a black draught next morning was an efficient way of treating abdominal troubles which we now call the results of intestinal stasis. Probably a more scientific way of administering these drugs is to reverse the order in which they are given. When a surgeon desires to disinfect his hands, he washes well with soap and water first and uses mercurial disinfectants afterwards. So in the preliminary preparation of a case in which a severe operation on the rectum or other portion of the large intestine is decided on, if obstruction is not pronounced, the following preparation tends to lessen the dangers of subsequent sepsis. Four or more days before the date fixed for operation, a full dose of castor oil should be given to empty the colon and rectum, followed the next day by a dose of calomel, and kerol capsules containing 6 min. three times daily, not only up to the time fixed for operation, but continued for some days afterwards. The bowel should again be thoroughly evacuated by drugs immediately before operation, and washed out with an antiseptic enema.

REFERENCES.—[1]*Amer. Jour. Obst.* 1914, i, 322; [2]*Med. Press and Circ.* 1914, Jan. 14.

K. W. Monsarrat, F.R.C.S.

PATHOLOGY.—Cheatle[1] relates an investigation into the spread of cancer in the lower part of the large intestine. Eight cases were examined. In seven the extension of the disease in the bowel wall was strictly limited. Very little spread was to be seen in the submucous tissue in any of them, and in fact there was no spread to be observed in any other part of the bowel wall. In one case, however, the diffusion of the disease was very extensive in all planes of the bowel wall, and also in the lymphatic glands of the mesocolon. This appears to be an exceptional case. The observations do not support the view that wide removal of the bowel wall is essential for recovery in most cases. Cheatle says: "I would advise an extensive removal of the bowel where possible, but the results of the examination of my cases give definite scientific reason to hope for a successful issue from a more limited removal of the intestine in cases which are obviously unfit for extensive and dangerous operations."

TREATMENT.—Chalier and Perrin[2] have compiled a valuable statistical record bearing on the immediate and remote results of the combined operation for rectal cancer. They present a total of 189 cases, including unpublished ones from the practice of Albertin, Delore, Hartmann, and other French surgeons. With regard to immediate results, the mortality in 187 cases, of which the result was known, was 44·6 per cent. If only the cases treated by surgeons who have performed the operation an appreciable number of times are taken, the mortality varies between the 16·6 per cent of Jonnesco and 40·8 per cent. The immediate prognosis is better in the woman (31 per cent) than the man (52 per cent). The mortality increases definitely with

age. There is no appreciable difference between that of resection and that of amputation. Infection is the great cause of operative mortality, and many of the deaths assigned to collapse and shock are really due to acute infections. The other causes of death are anuria, lung affections, obstruction, and hæmorrhage. Among troublesome but non-fatal complications are more or less prolonged retention of urine, injury to the ureter or bladder, fæcal fistula following gangrene of the bowel, and stenosis at the site of union of the two extremities in resection.

With regard to late results, the statistics of only 85 cases were produced. In this total there were 15 recurrences and 6 deaths from metastasis. Some of these occurred relatively late, after three, five, and six years ; 41 were alive without recurrence after periods of from two months to three years, 14 after periods of from three to twelve years. The remaining cases had died from intercurrent disease or from some unascertained cause, and some of these had been free from metastasis for long periods. They found the proportion of recurrence in women higher than in men, probably owing to the fact that some cases are operated on in the female which would be considered too advanced in the male.

Körbl[3] publishes an important report on the function of the bowel after radical operation for rectal cancer. He reviews 204 cases from v. Eiselsberg's clinic in two groups : (1) Those in which the sphincter was sacrificed ; (2) Those in which it was retained.

1. In one case a plastic operation to form a new sphincter (Shoemaker) was performed. At first the result was good ; but after two years there was incontinence for liquid stools. In a large group, Hochenegg's method of deflecting the bowel to the right and fixing it beneath the resected sacrum was employed. After about six months, in most cases sensibility to the presence of fæces returned, and the patient became aware of their escape. Out of 30 cases, 8 were without sensation, the great majority of these being cases in which there had been some sloughing of the gut. In these cases there was complete incontinence. In 16 cases sensibility was such that there was adequate warning for formed stools. Altogether, under regulated diet about half the patients were comfortable. In a third group of 17 cases Gersuny's rotation method was used. In all these there was sensation for fæces, and no incontinence for formed stools. Körtl finds this method definitely preferable to the ordinary sacral anus.

2. In those cases where the anus was retained, Hochenegg's method of resection was attended by a high mortality from infection, often traceable to gangrene. It is only indicated when speed is of particular importance. The functional results were good in 36 per cent. Circular suture was employed, either primarily or secondarily, in 34 cases ; the mortality was low, and functional results good in 66 per cent. Only if the local conditions are particularly favourable should complete primary suture be carried out ; otherwise the anterior half of the circumference is sutured, and the posterior attached to the skin, to be closed later. In three cases a loop of colon and rectum was brought through

the wound, and when this can be done easily it is a method of value. In 16 cases a combined abdomino-sacral operation was performed, with a mortality of 37 per cent. Körbl's evidence as to the value of Gersuny's manœuvre is valuable; the other point deserving attention is the preference for primary partial suture which his observations indicate.

Mayo[4] reports his technique of resection of the rectum with preservation of the sphincter. In cancers in which not more than eight inches require removal, and in which the distal segment is not nearer than two and a half inches from the anus, a sacral incision is employed, with resection of the coccyx and part of the lower sacrum. A preliminary colostomy is advised, which also permits an exploration of the abdomen and pelvis. At the end of twelve to fourteen days the sacral resection is performed. After the pelvic peritoneum is opened the bowel can be delivered, and the peritoneal opening is then closed by suture to the sigmoid. The bowel is divided between forceps, and the exposed edges are cauterized. The lower segment being twice the diameter of the upper, the latter is slit upwards on the surface anterior to its mesentery for 1¼ in. It may be advisable also to make two shorter incisions on each side. To avoid fistula in the suture line, which would usually occur at the free peritoneal or mesenteric side of the upper segment, the bowel is rotated one half to bring the peritoneal surface behind. This protects the mesenteric border. When suture is completed, two or three ounces of melted paraffin are poured over and into the cavity of the wound, especially the upper portion, where the parietal peritoneum has been closed. A rubber tissue drain is inserted on either side of the intestine and brought out of the sacral incision. If the anus is not relaxed, it is divulsed; if it shows any contraction upon examination, it is well to divide the sphincter muscle anteriorly. The colostomy incision can be closed as a rule two weeks after the resection. If the cancer is lower than 2½ in. from the anus, the colostomy is of the permanent type, and the rectum is removed as a whole at the second operation.

Swinford Edwards[5] protests against the indiscriminate use of the abdomino-perineal operation in cases of rectal cancer. He points out that seeing that the operation is attended by a mortality of something like 50 per cent, many lives are unnecessarily sacrificed. This opinion he bases on his own experience of 89 cases operated on by the parasacral or coccygeal route, and attended by a mortality of but 5 per cent, and 45 per cent of cures. He considers the abdomino-perineal operation indicated: (1) In all cases situated at the recto-sigmoid junction or lower pelvic colon; (2) Where the spread of the disease is suspected outside of the bowel owing to the presence of marked adhesions; (3) In rapidly growing cancer in young subjects. He considers it altogether contra-indicated above the age of seventy and in fat male patients.

For employment of **X Rays** in treatment, *see p.* 62.

References.—[1]*Brit. Med. Jour.* 1914, i; [2]*Lyon. Chir.* 1913, ix, 150; [3]*Arch. f. klin. Chir.* 1913, ci, 449; [4]*Surg. Gyn. and Obst.* 1914, i, 401; [5]*Proctologist*, 1914, viii, 12

RELAPSING FEVER. (*See also* SPIROCHÆTOSIS.)

Sir Leonard Rogers, M.D., F.R.C.P.

R. Steen and R. S. Townsend[1] record an epidemic of relapsing fever in the western districts of the United Provinces of India. The disease was most prevalent in the hot, dry months of April to June, and had a mortality of 26·5 per cent among 744 cases. Clinically, the disease was very similar to that seen in Bombay, and attacked the lowest and dirtiest classes, among whom the body louse, which was the most likely carrier of the infection, was commonly found. The disinfection of the clothes of patients admitted to hospital entirely prevented the disease spreading to other patients and sick attendants, although on previous occasions this had taken place. The incubation period appeared to be from four to eight days, and the infection was undoubtedly conveyed by patients, a number of people being often attacked in the same house and belonging to the same caste, in which respect the disease differs markedly from plague. Spirilla were usually readily found in the blood during the fever, and typical relapses occurred of a milder degree than the first attacks. Parotitis was seen in 7 per cent ; in half it suppurated, being then frequently fatal. No drugs had any effect on the disease, but salvarsan was not used.

C. H. Smith and G. F. Graham[2] record a small outbreak of relapsing fever, with rather small spirilla in the blood, which occurred at a height of 7000 feet on the Afghan frontier. They successfully inoculated three *Mus rattus* with freshly-drawn blood injected before it had time to clot.

R. E. Drake-Brockman[3] records an outbreak of African relapsing fever in Somaliland, where it appears to have been recently imported from British East Africa.

Galyl and **Sudyl** tried with success (*p.* 2).

REFERENCES.—[1]*Ind. Med. Gaz.* 1913, 338 ; [2]*Ibid.* 381 ; [3]*Jour. London Soc. Trop. Med.* 1913, 195.

RENAL DISEASES. (*See* KIDNEY.)

RHEUMATIC FEVER. *Herbert French, M.D., F.R.C.P.*

It appears to have been the experience of some that the intravenous method of administering salicylates in acute rheumatism is preferable to giving them by the mouth, when by the latter route they produce excessive symptoms of salicylism. Though the number of cases in which this is necessary must be very small indeed, it may sometimes be of value to be familiar with the technique employed by Conner.[1] A stock solution is made by dissolving 10 gr. of commercially pure crystalline sodium salicylate in 50 c.c. of distilled water which has been freshly sterilized by boiling. The drug is weighed and handled as aseptically as possible, and the solution after being made is not subjected to further sterilization. The solution should be perfectly colourless, and, if protected from the light, will keep for several days.

A rubber ligature is applied to the upper arm tightly enough to prevent the venous return flow, and if necessary the venous engorgement is increased by letting the arm hang down, and closing and opening the fist. The skin about the flexor surface of the elbow is sterilized with tinct. iodine. A 10-c.c. all-glass syringe, carefully sterilized, is filled from the stock solution. With the patient's arm fully extended and the vein fixed below by pressure of the left thumb, the needle is thrust into the vein in the direction of the venous flow. In order to be certain that the point of the needle is within the lumen of the vein, the piston is then slightly withdrawn. If a drop of blood appears at the mouth of the syringe, the ligature is loosened and the proper quantity of solution injected. As the needle is withdrawn from the vein, gentle pressure is made for a moment at the site of the puncture to prevent leakage of the blood into the subcutaneous tissue, and the iodine is then washed off with alcohol. No dressing is required. In case a good-sized vein is available in each arm, it is well to use the arms alternately, but no difficulty was found in using the same vein for a number of successive injections when necessary.

The size of the dose and the frequency of the injections will vary with the requirements of the individual. In most cases the dose was either 15 or 20 gr., and the injections were given at twelve- or eight-hour intervals over a period of from three to six days. Occasionally in robust men as much as 30 gr. have been given at a time, and as much as 120 gr. in the first twenty-four hours, without any unpleasant effects whatever. Indeed, one of the noticeable features of this method of administration, in Conner's experience, has been the entire absence of shock, prostration, or other objectionable constitutional effect.

Emphasis has been laid by certain writers upon the irritant effects on the kidneys of large doses of the salicylates, especially if continued for a considerable time. In the cases treated intravenously, no such effects were observed when the drug was continued in daily amounts of from 75 to 100 gr. for several days.

As regards the therapeutic effect of the intravenous method, Conner's experience has been that the relief of pain is prompter and more pronounced than when the drug is administered by mouth. It has been common to see a patient, who has been suffering intensely, obtain almost complete relief from pain for a number of hours after an injection, and look forward with impatience to the next one. In spite of such examples of marked benefit, however, Conner is by no means convinced that the intravenous method is, in general, more effective than the usual one, and he is far from feeling that it should replace it for routine cases.

Melubrin said to be a useful salicyl compound, *p.* 19; also **Magnesium Sulphate, *p.* 19.**

REFERENCE.—[1]*Med. Rec.* 1914, i, 323.

RHEUMATIC HEART DISEASE. *Carey Coombs, M.D., M.R.C.P.*

Recent work emphasizes the importance of the rheumatic infection as a cause of death and disablement through its immediate and remote effects on the heart. Realizing this more clearly, the profession is seeking for means of prevention and treatment through a fuller knowledge of etiology and pathogenesis. Symptomatology and prognosis too have been more accurately studied.

Etiology.—Swift[1] emphasizes the fact that acute rheumatic infection produces a pancarditis, in which all parts of the heart are implicated, muscle and pericardium as well as valves. The infective agent, a streptococcus, enters the heart wall from the systemic circulation by way of the coronary arteries. Hence portals of entry such as enlarged tonsils, adenoids, and decayed teeth must be attended to.

In the analysis of 350 fatal cases published by Poynton, Agassiz, and Taylor,[2] two-fifths of the patients under twelve were males, while after twelve the males preponderated slightly. Heredity played a part in 26 per cent. As to age, " rheumatism is at its worst from the sixth to the twelfth year, and by far the majority of deaths occur before the twentieth year."

Symptoms.—It is a striking fact that in spite of the invariable occurrence of multiple inflammatory foci in the myocardium in acute rheumatic carditis, clinical evidences of focal disturbance of myocardial function are rarely encountered. Sutherland[3] and Neuhof[4] record examples of auricular flutter, and there is an increasing list of cases of heart-block ; but as the writer[5] showed, this latter phenomenon, together with the milder grades of depression of conductivity, is infrequent if considered in proportion to the general frequency of rheumatic heart disease. The fact is that the foci are too small to cut seriously into the myocardial functions, even where these are localized in their particular strands of muscle. Dilatation and hypertrophy, effects of the diffused rheumatic poison on the muscular cells themselves, are far more common and serious.

Prognosis.—The analysis by Poynton, Agassiz, and Taylor,[2] brings out facts of importance. The younger the patient, the more likely is a first attack to prove fatal. For those who survive to the years of adolescence and adult life, more or less complete invalidism was the rule in their cases, though about 50 per cent were able to do some work until the last year of life. Subcutaneous nodules were noted in 45 per cent of the fatal cases in childhood.

Kemp[6] followed up a number of cases of acute articular rheumatism in order to find what was the outlook in regard to cardiac complications. Of the patients thus studied, 23 per cent " went through one or more attacks of acute rheumatism without any clinical affection of the heart, irrespective of the age when first attacked." Signs of carditis disappearing during convalescence were noted in 22 per cent. In 18 to 20 per cent there were signs of cardiac inflammation which had not disappeared when the patient was discharged from hospital, but which did not develop into permanent cardiac disease. " In

14·5 per cent of cases with acute rheumatic endocarditis of severe type, the murmurs underwent a change, resulting in the disappearance of one or more of the murmurs." Bruits of this kind he ascribes to associated ventricular dilatation, and finds to be softer than those of valvular disease. If recovery is to occur, there are signs of improvement within twelve months of onset, though the process of recovery may not be complete till some years later.

TREATMENT.—Cautley,[7] speaking of rheumatic heart disease in children, insists on the importance of rest, with gradual return to activity. He condemns the use of Swedish and other exercises during the earlier phases of recovery from acute carditis, as throwing undue strain on the partially restored myocardium. **Blistering** is of use, he thinks, in pericarditis, but he is (not unnaturally) sceptical of their value in valvular and myocardial inflammation. He does not care for ice applications, preferring heat as more soothing. Withdrawal of blood, by **Venesection or Leeches,** must be reserved for cases of acute dilatation. Purgatives are essential, and he mentions especially the pill of **Mercury, Digitalis, and Squill** for patients with hepatic engorgement. He recommends **Digitalis,** but without stating the indications upon which he is accustomed to rely. As for **Salicylates,** he is unable to advance reliable evidence that the course of the cardiac inflammation is affected by their administration.

For a full account of the treatment, G. A. Sutherland's new book, *The Heart in Early Life* (Oxford Medical Publications, 1914), should be read.

REFERENCES.—[1]*Med. Rec.* 1914, i, 333; [2]*Pract.* 1914, ii, 445; [3]*Proc. Roy. Soc. Med.* (Sect. *Child. Dis.*), 1914, vii, 133; [4]*Med. Rec.* 1914, ii, 63; [5]*Quart. Jour. Med.* 1914, July, 494; [6]*Ibid.* Apr. 251; [7]*Clin. Jour.* 1913, Nov. 486.

RHEUMATISM, CHRONIC.

For the position of **Phylacogen** treatment (*p.* 26); external application of **Potato Juice** commended (*p.* 28); **Testi-iodyl** (*p.* 34).

RHEUMATOID ARTHRITIS. *Herbert French, M.D., F.R.C.P.*

That nervous influences play a considerable part in connection with the lesions of chronic joint cases has long been the view of many, and a purely nervous cause seems to lie at the root of two types at least, namely (1) Charcot's joints in tabes dorsalis and in syringomyelia and (2) Hydrops articulorum intermittens. In most other chronic joint troubles an infective factor is generally pre-supposed by modern pathologists, whatever may be the influence of the nervous system in addition. Cohen[1] has written a most instructive paper, which goes far to convince one that, in addition to obvious Charcot's joints and intermittent hydrops joints, there are others in which the changes are due entirely, or almost entirely, to functional alterations in the nervous system, particularly in the vasomotor nerves, the resultant objective changes being frequently mistaken for gout or rheumatoid arthritis. The conditions which he describes are in his

opinion allied to other functional vasomotor neuroses, such as angioneurotic œdema and Raynaud's disease, and he describes them as angioneural arthroses. There may even be actual pyrexia in association with the joint changes, simulating the fever of an infective lesion, but really comparable to the pyrexia of Meige's disease and some cases of angioneurotic œdema. Cohen's clinical account of the conditions he refers to merits quotation at some length. He points out that only in rare cases are the successive attacks relatively consistent in type, as they are with nervous hydrops articulorum intermittens; the phenomena are variable and capricious. The chief symptoms are pain, swelling, discoloration, and fever.

"Pain and swelling are usually associated. They frequently develop, subside, and reappear together. Either, however, may be present without the other. Sometimes they alternate; sometimes they appear and disappear without any evident mutual relation. The extent of the swelling, moreover, is never an index to the degree of pain, whether directly or inversely; there may be intense pain with no swelling, or considerable swelling with no pain. Either symptom may precede, either may outlast, the other.

"The swelling may be due to effusion into the joint or to œdema of the overlying soft parts, or both. Sometimes the painful joint and the tissues about it are not swollen, but a lump or lumps will appear on the limb, at a greater or less distance above the joint.

"The pain is ordinarily referred to the joint or joints apparently affected. Sometimes, however, it extends quite a distance along the limb, or is reflected to a distant point—most frequently, but not invariably, an articulation. Thus, when the wrist is involved, the chief complaint may be of pain in the elbow, the upper arm, or the shoulder—as a rule, of the same side, but sometimes of the other side—or even of substernal pain; or elbow pain may be associated with disturbed sensation in or around the mammary gland. The pain is variously described as burning, boring, stabbing, aching, or general soreness. It may be constant, remittent, or intermittent. Sometimes it is absent when the affected part is at rest, and is experienced only upon active motion. In other cases it is aggravated even upon passive motion. In a few instances, the most gentle touch induces exquisite agony. This is especially marked at times when the costochondral junction is affected.

"Numbness and tingling ('pins and needles' sensation) are frequently experienced in the fingers and toes: not only when these are themselves swollen and discoloured, but also when their appearance is normal and the chief incidence of the disorder is elsewhere. Paræthesiæ of various kinds in any part of the body—thus in one patient always in the face and lips: most frequently, however, in the extremities—may be premonitory symptoms.

"The skin of the affected part of the limb at some distance from the joint to which the pain is referred, may be discoloured. It is usually reddened; sometimes cyanotic, mottled, or pale and glistening;

occasionally the seat of a papular, vesicular, or bullous eruption. Sometimes, however, there is no change of tint beyond that attributable to the distention. At other times there may be very slight and circumscribed swelling, but extensive reddish or purplish discoloration. The discoloration may be persistent, but ordinarily it can be markedly lessened by gentle stroking in the direction of the venous current, or by elevation of the limb. When a terminal phalangeal joint is affected there may be ulceration at a nail margin. There may also be general or localized erythema of face, trunk, or extremities.

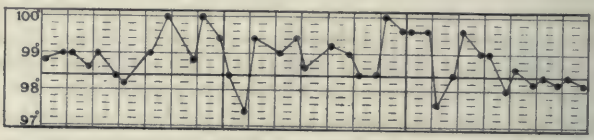


Fig. 86.—Capricious temperature chart in a febrile case of neuro-polyarthritis.

" Subjective heat in the affected part is common ; but objective heat of a corresponding degree, or even sufficient to be detected by the touch of a normal hand, is relatively infrequent.

" Fever is not common. When present it may be continuous, recurrent, or intermittent. It may show only as a rise of temperature, or there may also be headache, malaise, lassitude, and other constitutional disturbances. Headache or malaise or both may exist without elevation of temperature. In some persons there is both rise of

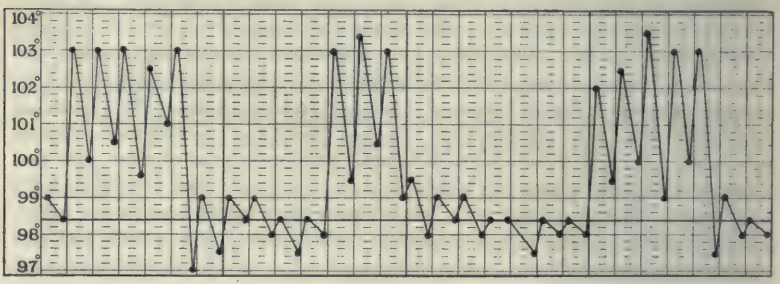


Fig. 87.—Portion of a chart of a febrile case showing irregular periodicity.

temperature and constitutional disturbance in every attack. In some there is rise of temperature only ; in others, headache only. In some, the pyrexia is preceded or followed or punctuated by chills or chilly sensations ; or there may be chilly sensations without temperature change. In others there is never any febrile movement whatever ; while still others may have fever in one attack and none in the next.

" In febrile cases the temperature curve is either entirely capricious —rising and falling without rhythm or apparent reason—or shows a

curious tendency to what may be termed an irregular periodicity. Perhaps this might better be described as paroxysmal. As a rule the temperature rises suddenly and falls suddenly, when uninfluenced by treatment. The height varies: ordinarily it is moderate, between 101·5° and 103°; it may reach 104·4°, or may keep below 100°. The time of maintained height may be a few hours or a few days; rarely a week. In most cases the temperature falls to the normal, or to a point slightly above or below the normal, in from twelve to seventy-two hours. Recovery may then ensue shortly, or after a week or two, without further temperature rise. If the case be prolonged, however, the curve tends to remain low, with slight fluctuations, for a variable time—from a day or two to a week or more—and then again rises abruptly, and remains high, or with a sharp up-and-down movement, for two or three days or more, to subside as suddenly as it rose. This may be repeated several times in the course of a long attack; but in only one case was there an approximation to regularity in the periods either of intermission or of relapse. In that instance the free periods were five or seven days, and the febrile periods three or five days. There were four of the latter, the entire attack lasting about six weeks. One would be inclined to separate the prolonged febrile cases from the afebrile and brief cases, did not the same patient exhibit at different times, both forms—and still other varieties.

"Apart from the symptoms, the chief factors of the morbid complexus are *duration*, *recurrence*, *extent*, and *distribution*. The duration of a particular attack may be brief or prolonged—from a few hours to many weeks. It may be continuous, remittent, or intermittent. Recurrence may be periodic or irregular, at short or long intervals—from days or weeks to months or years. Thus the patient may have four or five attacks every year, for two or three or more years; and then perhaps be entirely free for five or even ten or more years. Or daily or weekly brief attacks may continue for months, and freedom suddenly ensue, to be maintained for a few months or for several years. In this respect the condition parallels the more familiar angioneuroses of the skin and mucous membranes—urticaria, asthma, lingual and laryngotracheal (angioneurotic) œdema, etc. Extent may be slight or great, distribution constant or variable. In most of the cases of 'hydrops articulorum intermittens' upon record, a single, and always the same, joint was affected in the recurrent attacks—in the majority of instances a knee. In the slighter forms, and especially in those which involve rather the soft tissues about the joints than the articular structures, several joints may be affected simultaneously or in succession. A single finger-joint or a single toe-joint may indeed suffer, but this is comparatively uncommon. Recurrences may affect the same joint or group of joints, or different groups. No joint in the body is immune. He has seen three cases affecting the spine or overlying soft parts, at least two cases affecting the temporo-maxillary articulation, and one case of crico-arytenoid involvement.

"*Sex.*—Males, 12 (44·5 per cent); females, 15 (55·5 per cent).

"*Age.*—Less than twelve years, 8 (29·6 per cent); between twelve and twenty-five years, 12 (44·5 per cent); between twenty-five and fifty years, 5 (18·5 per cent); between fifty and seventy years, 2 (7·4 per cent).

"*Attacks.*—Observed in one attack (or series) only, 13 (49·5 per cent). Observed in several attacks (or series), 14 (50·5 per cent). Total number of attacks (or series) observed in or reported by 27 persons, 110.

"*Fever.*—Febrile in all attacks, 5 (18·5 per cent). Febrile in one or more attacks, but not in all, 6 (22·2 per cent). Afebrile throughout, 16 (59·3 per cent).

"*Parts Affected.*—Joints only, 3 (11·1 per cent). Soft tissues only, 8 (29·6 per cent). Joints and soft tissues, 16 (59·3 per cent).

"*Distribution.*—Multiple in several attacks, 16 (59·3 per cent). Multiple in one attack only, 3 (11·1 per cent). Monarticular in all attacks, 8 (29·6 per cent).

"*Intra-articular Affections.*—Spine: cervico-occipital, 1. Face: temporomaxillary, 2. Extremities: wrist, 6; knee, 3.

"*Intra- and Peri-articular Affections.*—Crico-arytenoid, 1; temporomaxillary, 1; lumbosacral, 1; sternoclavicular, 3; chondrosternal, 2; vertebrocostal, 4; shoulder, 5; elbow, 10; wrist, 14. Hand and fingers: metacarpophalangeal, 14; interphalangeal, 16. Hip, 1; knee, 9; ankle, 8; heel, 4; toes: metatarsophalangeal, 6; interphalangeal, 3.

"*Peri-articular Affections.*—Acromioclavicular, 1; shoulder, posteriorly, 1; hand and fingers, 10; foot and toes, 6; wrist, 7; lumbosacral junction, 2; costochondral junction, 4."

Diagnosis.—From what has been said, and from the histories given, both the difficulty and the ease of diagnosis should be evident. To mistake the condition for gout, rheumatism, muscular rheumatism, myalgia, neuralgia, neuritis, etc., is common, and is, indeed, excusable, so long as one's attention has not been directed to the subject; and the subject is ignored by most text-books and systematic writers. In members of gouty and rheumatic families and in hysterical subjects, the discrimination may be peculiarly difficult—and just such persons yield the majority of the cases. Cohen has elsewhere discussed this relationship, as well as that of hysteria, neurasthenia, tuberculosis, cancer, diabetes, and epilepsy, to autonomic disorders in general.

"In *afebrile* cases the chief elements in diagnosis are the recurrent tendencies of the disorder, the family and personal history, and the characteristic signs of constitutional peculiarity (idiosyncrasy) exhibited by the patient.

"In *febrile* cases, the discrimination from rheumatic fever is at first difficult. A knowledge of the patient and his family helps, but may also lead astray, since a subject of autonomic ataxia is as liable as any other person to rheumatic infection. In the absence of authoritive

bacteriological, sereological, or other exact tests for infective polyarthritis, the diagnosis becomes evident only as the case proceeds. It must be based on all the phenomena, not on any one point. Considerable reliance, however, may be placed on the temperature curve, which, as pointed out, may be utterly capricious or exhibit certain more or less well-defined phases, or even an apparent periodicity. Marked increase of eosinophiles or a disproportionately low count of polymorphonuclear leucocytes, or a marked excess of urinary indican or ethereal sulphates, favours the diagnosis of angioneural disturbance, but is not conclusive. Nor are any of the reverse conditions conclusive negatively."

Treatment.—Whilst most modern clinicians hold the view that many different micro-organisms or their toxins may produce apparently identical joint lesions of the rheumatoid arthritis type, with the spindle-shaped enlargement of the first interphalangeal joints and so on—Hale White's acute rheumatoid arthritis—Warren Crowe[2] brings forward further experimental evidence to support his view that it is, at any rate in the great majority of cases, due to one particular organism which he styles the *Staphylococcus deformans*. In previous communications he termed this *Staphyloid Coccus A*, but he now finds its cultural characteristics are so similar to those of the *Staphylococcus epidermidis* that he calls it the *Staphylococcus epidermidis var. deformans*, or the *Staphylococcus deformans*. He bases his argument that this microbe is the essential cause of acute rheumatoid arthritis upon the fact that he is able to cultivate it from the urine in about 90 per cent of all cases of the disease, whilst at the same time complement-fixation tests seem to show that the micro-organism is causal and not casual. He also finds that the same organism is recoverable from the urine in many cases of obscure neuritic trouble, and he holds that there is a close connection between neuritis and acute rheumatoid arthritis. He has found much benefit from the use of **Vaccines** prepared from the *Staphylococcus deformans* in the treatment of both obscure neuritis and acute rheumatoid arthritis when this micro-organism has been shown to be present in the patient's urine.

As an illustration, however, of how little united pathologists and others are in their views upon the bacteriology of this form of joint-disease, one finds Fuller[3] stating with equal dogmatism that, in his opinion, many cases are due to a streptococcus; and he believes that in a very large number of male cases this streptococcus is derived from post-gonorrhœal infection of the genito-urinary tract. The site from which he believes the infection to be derived in most of these is the seminal vesicles, and he has operated upon no fewer than 346 cases of chronic arthritis deformans by **Opening up and Draining the Infected Seminal Vesicles.** It was not the gonococcus that was recovered from the vesicular infection, as might have been expected, but uniformly a streptococcus, due in his opinion to post-gonorrhœal secondary infection, and he has found that a similar affection of the

seminal vesicles may arise in the absence of any previous gonorrhœa. His series includes a large number in which there was extreme fixation from peri-articular inflammation, and he states that although improvement after the operation on the vesiculæ seminales may be delayed for several months, the ultimate benefit has been almost without exception considerable. He finds that it is very important not to allow premature external closure of the wound leading down to the incised seminal vesicles, but to maintain drainage tubes in position until the deep portion of the wound has granulated thoroughly and healed. Another essential surgical point lies in a thorough and free opening throughout the entire length of the affected seminal vesicles. In very chronic conditions the sclerosed walls are lined with pyogenic granulation tissue, which should be removed. Again, when there is much periseminal vesicular sclerosis it is necessary to free the organs from surrounding adhesions, and then to make a counter-incision into the sac opposite the cut which first opens the cavity. This counter-incision divides the sac wall lying next the floor of the bladder, and although care should be exercised not to cut into the bladder itself, it often happened that urine leakage resulted through the wound, especially when the sac had been adherent, infiltrated, and perhaps riddled with sinuses; urine leakage of this character did not interfere with a final good result from the seminal vesiculotomy. Another important operative feature after the diseased area has been thoroughly exposed is the introduction of the packing; each seminal vesicle should be treated with a separate long strip of gauze, which should be so packed in as to fill the open cavities firmly and completely. It is over this packing and between it and the rectal wall that the drainage tubes are placed.

Crespin,[4] again, concludes that typhoid spine is but a particular variety of infective peri-arthritis.

Wallace and Child[5] recommend a special **Extract of the Pituitary Body** of the ox in the treatment of rheumatoid arthritis, especially in children. They have found that adult cases were also relieved by the treatment, but most of their patients were children suffering from that type of the malady known as Still's disease. At first they used commercial pituitrin, intramuscular injections of from 1 to 3 c.c. being administered every other day, the only ill-effects being nausea, vomiting, and enuresis when the drug had been given for some time. Having found very great improvement in the condition of the joints from the use of pituitrin in this way, the authors made experiments to discover some other pituitary preparation, which might be less liable to lead to nausea and vomiting, and what they employed in their latter cases was prepared as follows: 0·3 gram of desiccated fresh pituitary body of the ox was put into 30 c.c. of sterile physiological salt solution; 0·3 gram of chloretone crystals was added, and the whole allowed to stand for three hours. The mixture was then filtered through sterile filter paper, the filtrate boiled, and kept in a sterilized bottle with a rubber cap on it. This extract will remain

fit for use for three weeks, but should not be employed after it has been kept longer than this. The dose given is 1 c.c. by intramuscular injection, generally every other day. The patients described by Wallace and Child as treated in this way were practically crippled before the treatment was adopted ; all put on weight, the swellings around the joints disappeared, and the patients could move them without pain after two or three months' treatment.

Pemberton[6] describes in elaborate detail the exact **Dietaries** that he has employed in different cases of rheumatoid arthritis in the attempt to discover whether the nature of the food eaten has any bearing upon the severity of the joint symptoms. The general conclusion to be drawn seems to be that diet has little relationship to rheumatoid arthritis ; at any rate, no advantage is to be gained by excluding red meats from the dietaries of these cases, and Pemberton's data afford no support to the popular fetish that acids and fruits are deleterious to such patients ; in fact, tomatoes, apples, and vinegar in salad dressing were used in some of his cases in large amounts, with benefit to their condition rather than the reverse. His researches lead him to conclude that, whatever other things may be causative factors in the disease, it is not due to faulty elimination through the bowels or kidneys, and certainly not to intestinal putrefaction.

Midelton[7] advocates the use of **Continuous Counter-irritation over the Spinal Cord** in the treatment of arthritis deformans, believing as he does that nervous changes are an important factor in the causation. The principal methods employed by him are : (1) Blisters followed by savin ointment ; (2) Acupuncture with counter-irritant drugs, such as cantharides, croton oil, or oil of mustard ; (3) The galvanocautery. Of these, he considers the first two the most efficacious, and from his own experience he thinks that the dangers of cantharides employed externally have been much exaggerated. Improvement in extreme cases is necessarily slow ; but he advocates the use of continuous counter-irritation over the spine in this way, even in the most advanced cases where all treatment may appear to be hopeless. He recommends that in many instances dry **Thyroid Extract** should also be given to the patient ; the dose varies in different cases, but upon the whole he finds that 1 gr. given once a day at bedtime is the best.

Ewart,[8] from personal experience in his own case, advocates the intensive **Free Iodine** treatment for chronic arthritic conditions. He found most benefit from using a 10 per cent iodide-free French tincture of iodine up to a daily total of 100 drops containing 10 gr. of free iodine. [One wonders whether similar benefit might not result from the use of the other form of intensive iodine treatment in these cases, namely, the taking of a large dose of iodide of potassium in the morning, following by chlorine water in the afternoon.—H. F.]

Roberts[9] is a strong advocate of the use of **Glandular Extracts** in chronic arthritic cases, whatever other treatment may be adopted at the same time. The three he employs in particular are thyroid,

thymus, and pituitary extracts. Of these, he considers that thyroid extract is less beneficial than the other two. The thymus-gland extract can be given in doses of 10 to 15 gr. of the dry extract three times a day ; unless sealed in capsules it will not keep. He says that it is contra-indicated only in cases in which there has been a rapid increase in weight, because at times it stimulates general nutrition to an unusual extent ; he also says that disappointment in the use of thymus-gland extract in this way is frequently due to its slow action. It should not be abandoned before six months of continuous use. In his use of pituitary body for the same purpose he has followed the intramuscular injection method, and in many cases with striking improvement in the pain and joint swellings. He has also employed capsules of the powdered anterior lobe of the gland, giving 2 gr. three times a day in conjunction with thymus-gland powder, and he is of the opinion that when both are thus employed the results are better than when either is used separately.

Diagnosis.—Luff[10] writes on the differences between gout and rheumatoid arthritis. The following distinguishing characters show how very different the two diseases are. In the first place, rheumatoid arthritis occurs most commonly in females ; gout mostly in males. Rheumatoid arthritis occurs more commonly amongst the poor and ill-nourished ; gout mostly among the well-to-do and well-nourished. Rheumatoid arthritis is a disease which is improved by good dieting ; in the case of a gouty person a spare and plain diet is indicated. The onset of rheumatoid arthritis is insidious ; that of gout sudden and obvious. As regards the commencement of the attack, gout most commonly begins in one of the feet, especially in the great toe-joint ; rheumatoid arthritis, although ultimately it frequently affects many joints of both hands, nearly always begins in one joint, most commonly selecting one of the joints of the thumb, either the carpometacarpal or metacarpophalangeal joint, after which it rapidly spreads to the other joints. In the case of rheumatoid arthritis there is no obvious swelling at first, and no marked redness, while in the case of gout, at its commencement there is very obvious swelling, marked redness, and a shiny condition of the skin around the affected joint.

In rheumatoid arthritis there is very little pain at first. There is some aching in the joint, but it starts in a very insidious manner. It is this insidious character which is one of its bad features, for the patients do not seek advice until the affection is fairly advanced. Gout, however, begins, in the most marked manner, with severe pain, the patient as a rule waking up in the early morning with excruciating pain in the great toe. Therefore, if there is doubt as to whether a particular case is one of rheumatoid arthritis or of gout, the patient should be questioned as to the commencement of the attack, in order to ascertain whether it began with an obvious outburst of pain and with swelling and redness of the joint, or whether the outset was very insidious.

Luff has never seen a case of gout in which the temporomaxillary joint has been affected, whereas in rheumatoid arthritis it is fairly common for that joint to be affected. In rheumatoid arthritis there is a special liability to the affection of the joints of the cervical vertebræ, as evidenced by pain and stiffness at the back of the neck. This is a most useful distinguishing sign. Another distinction—and it is perhaps one of the most important — is that in connection with rheumatoid arthritis there is a remarkable symmetry in the affection of the smaller joints of the hands. In gout that symmetry is wanting. Lastly, in a case of rheumatoid arthritis sodium biurate is found neither in the joints nor in the blood, whereas in the gouty person it exists in both.

Rheumatoid arthritis is essentially a disease that requires good and nutritious feeding, and Luff has seen many cases which have gone thoroughly to the bad through the initial error of mistaking the disease for gout and treating it with a spare diet.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1914, ii, 228 ; [2]*Lancet*, 1913, ii, 1460 ; [3]*Med. Rec.* 1913, ii, 691 ; [4]*Presse Méd.* 1913, 877 ; [5]*Med. Rec.* 1913, ii, 608 ; [6]*Amer. Jour. Med. Sci.* 1914, i, 111, 265, 423 ; [7]*Med. Press and Circ.* 1913, ii, 422 ; [8]*Brit. Med. Jour.* 1914, i, 1068 ; [9]*Med. Rec.* 1914, i, 829 ; [10]*Lancet*, 1914, i, 442.

RIB, CERVICAL. *Purves Stewart, M.D., F.R.C.P.*

A cervical rib is sometimes rudimentary, amounting merely to an exaggeration of the transverse process of the vertebra ; at other times it is well developed, with its anterior end ending in a costal cartilage attached to that of the first thoracic rib. The occurrence of cervical ribs is probably much more frequent than is usually suspected, since it is only in a small proportion of cases that pressure symptoms are produced. The presence of a cervical rib which is not producing symptoms is best detected by radiography, though sometimes it may be discovered clinically when examining the region of the apices of the lungs.

Pressure symptoms, when present in cervical rib, are usually unilateral, whilst cervical ribs themselves are usually bilateral, although not always equally developed on the two sides. In the majority of cases the symptoms arise spontaneously ; in a few there is a history of some strain or other injury to the affected limb. Ordinarily the symptoms are caused by upward pressure on the first thoracic nerve root, and consist in pain or tingling down the inner border of the forearm and hand, together with weakness and wasting in certain intrinsic hand muscles, notably those of the thenar eminence.

The symptoms generally make their appearance in adult life, and are commoner in female than in male patients. Wingate Todd[1] offers an ingenious explanation of this fact in the normal descent of the shoulder which takes place between infancy and adult life. He points out that the further the shoulder drops, the greater is the tendency for the lowest nerve trunk of the brachial plexus to be stretched over the highest rib. He shows that in women, the drop of the shoulder is

more marked during adolescence than in men. In cases with a cervical rib, symptoms are thus readily produced; and even with a normal first thoracic rib, similar symptoms may also arise, as has been repeatedly observed, e.g. in cases recorded by Thorburn,[2] Murphy,[3] and Morley,[4] in all of which pressure-neuritis occurred in the absence of a cervical rib, and was promptly relieved by excision of a normal first rib. In other cases, nerve symptoms are slight or absent, and the symptoms are mainly due to vascular obstruction from compression of the subclavian vessels, especially the artery which lies above the cervical rib. Two such cases are reported by Telford[5] of Manchester, in which the patient developed pallor, pain, and coldness in the affected limb, beginning in the fingers; the radial and other arterial pulses in the limb were not palpable, and in one case a small patch of gangrene occurred at the tip of the index finger.

REFERENCES.—[1]*Anat. Anzeiger*, 1912, xli, 385; [2]Dreschfeld Memorial Volume, Manchester, 1908, 85; [3]*Austral. Med. Jour.* 1910, 582; [4]*Clin. Jour.* 1913, ii, 461; [5]*Lancet*, 1913, ii, 1116.

RINGWORM. *E. Graham Little, M.D., F.R.C.P.*

Batten[1] describes an apparatus that he has devised for the **X-Ray** treatment of ringworm of the scalp, which he claims shortens the duration of application by a third, without any sacrifice of safety. The apparatus, which is described at length in the paper, can be obtained from the makers, Messrs. Newton & Wright.

Emrys-Jones[2] gives his statistics of 200 cases treated with **X Rays** in the past two years. In 93 of these the entire scalp was affected; in 26 cases a second application of rays was required. Out of a total number of 630 applications, no case of burn or permanent alopecia was met with. In all, the single-dose method was used.

Foley[3] has found striking success with a method which is thus described: The affected patch is washed with a strong solution of sodium bicarbonate, swabbed with a piece of lint moistened with spt. ætheris, dried, and then painted with tinct. iodi mitis, and immediately frozen, until the skin is a china white, with **Ethyl Chloride** spray. In tinea of the scalp, three or four applications were required; in tinea circinata, one usually sufficed.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 924; [2]*Ibid.* 849; [3]*Ibid.* 1914, i, 651.

RODENT ULCER.

For **X-Ray** treatment (*p.* 64); **Radium** (*p.* 66).

(*Vol.* 1913, *p.* 439)—**Carbon-dioxide Snow** is warmly recommended by Reginald Morton.

SALIVARY GLANDS, ENLARGED. (*See* MIKULICZ'S DISEASE.)

SALPINGITIS. *Bryden Glendining, M.S., F.R.C.S.*

The Results of Surgical Treatment.—Scudder[1] records the results, and in a large proportion of cases the after-histories, of cases of diseased tubes surgically treated. Before operating, he tries, by simple measures such as douching, purgation and absolute rest, to allow the pelvic

inflammation to settle, so that when operation has at last to be undertaken, it is simply to remove what may in many instances be considered a residual abscess or a diseased adherent appendage. The operation mortality was 4 per cent in a series of 74 cases. Of those in which it was possible to follow the subsequent history for any length of time, 92·3 per cent reported themselves as relieved by the operation, and 7·6 per cent were unrelieved.

Of 12 cases in which only one tube was removed and in which conception was therefore possible, subsequent pregnancy occurred in 4, and in none was there an extra-uterine fœtation. Five of the cases developed hernia of the scar. Of all the cases admitted and in the first instance treated expectantly, only 5 cases escaped operation. Only one was heard from subsequently, and she complained of pains suggestive of chronic salpingitis.

REFERENCE.—[1]*Boston Med. and Surg. Jour.* 1914, ii, 98.

SARCOMA OF THE SKIN. *E. Graham Little, M.D., F.R.C.P.*

Sequeira[1] reports an extraordinary instance of sarcoma of the skin of the forehead and scalp secondary to a chondrosarcoma of the tarsus. The right foot was amputated in 1910 for a tumour, supposed at first to be tuberculous, but proved by histological section to be chondrosarcoma. In July, 1914, he began to notice a swelling and redness of the forehead, which rapidly increased in elevation and area, the surface being mammillated so as to give the appearance of numerous small, pink, soft, rounded tumours clustered together like a bunch of grapes. Similar small, pink, discrete growths developed on the cheeks. There was also a red swelling attached to the upper jaw on the right side, with an ulcerated surface and a sanious discharge. The growth inside the mouth was removed by diathermy. The cutaneous swellings were treated with massive doses of **X Rays,** but they were in no way checked by treatment and grew rapidly, and the patient elected to go home, and was lost sight of. One of the skin tumours was excised and examined microscopically, and proved to be also chondrosarcomatous.

REFERENCE.—[1]*Brit. Jour. Derm.* 1914, 411.

SCAPULA, CONGENITAL ELEVATION OF. *F. W. Goyder, F.R.C.S.*

A most interesting series of eighteen cases has been collected by Fairbank.[1] Since other local developmental defects, such as wedge-shaped vertebræ, are common, he regards the condition as due to faulty segmentation of the mesoblast in early fœtal life. These scapulæ are often short in their vertical measurements, and usually, but not invariably, fixed by a bridge of cartilage, fibrous tissue or bone, to the spine, often in the region of one or more laminæ. Rigid curvature of the spine commonly co-exists. Exostoses of the scapula are sometimes found. The most constant feature is imperfect mobility (*Plate LI*). Treatment should be directed towards correcting the scoliosis by exercises. It must be remembered that this may not

be present at birth, but may develop relatively late. Operation while restoring mobility, seldom gets rid completely of the elevation of the scapula. If there is no definite anchoring tissue to be felt, it is probably inadvisable to operate. The whole paper is well worth study.

REFERENCE.—[1]*Brit. Jour. Surg.* 1914, Apr. 553.

SCARLET FEVER. *E. W. Goodall, M.D.*

ETIOLOGY.—A. L. Dykes,[1] as a result of an investigation into the relation between the colour of the eye and the incidence, severity, and fatality of scarlet fever and diphtheria in the Borough of West Ham, concluded that so far as the evidence went, light-eyed children are more susceptible to the diseases in question, and also more likely to succumb, than dark-eyed children.

PATHOLOGY.—In December, 1910, E. C. Schultze,[2] of New York, described an organism which he believed to be of some importance in the etiology of scarlet fever. Further studies have been made by N. S. Ferry,[3] of Detroit. He states that there are difficulties in isolating the organism and growing it in pure culture, though it can be demonstrated in a large majority of smears taken early in the illness. The greatest number of positive results was obtained by swabbing the posterior pharyngeal wall, and allowing the swab to stand in a test-tube of bouillon for a few hours. The entire amount of bouillon is then plated out in the usual manner. " The organism was not isolated in the later stages of the disease, and was not found in any of the purulent discharges nor in the blood, which seems very significant, considering the fact that it appears to coincide with the contention of the majority of observers that the disease is contagious only in its early stages." [But it is notorious that the infection of scarlet fever hangs about many patients for weeks ; and there are strong reasons for believing that some of the purulent discharges, especially that from the nose, contain the infecting organism.—E. W. G.] Ferry found that the organism predominating in the plates was a streptococcus, while next came Schultze's coccus or a staphylococcus.

Schultze's micrococcus (or *Mic.* '*S.*') is a large, clearly defined, biscuit-shaped diplococcus, sometimes appearing in tetrads, and about the size of the meningococcus and gonococcus. It is not capsulated, and it is Gram-positive. Experiments were made on several monkeys with this coccus with a view of producing scarlet fever in them ; but " in all of the experiments, with the exception of a slight rise of temperature on the fifth day, followed by a swelling of the nearest lymph glands, accompanied by a general indisposition, there . . . were no signs or symptoms whatever simulating or approaching those of scarlatina as it is recognized clinically to-day."

Ferry draws attention to the similarity of this organism to one described fifteen years ago by Chass,[4] but mentions several important points of difference.

SYMPTOMS.—E. Mey[5] has recorded two cases of severe *abdominal*

PLATE LI.

CONGENITAL ELEVATION OF SCAPULA

A. *B*

(*A*) Boy, age 7. Left scapula elevated and anchored to spine by a bridge of bone, well seen in the illustration.
(*B*) Shows limitation of movement of arm typical of these cases.

Illustrations kindly lent by "British Journal of Surgery."

pain occurring during convalescence from scarlet fever. It lasted in each case about a week, during which period there was albuminuria in one case. In both cases, just before the attack of pain in the abdomen, there were pain in the neck, sore throat, and some swelling of the cervical glands. Both patients recovered. It is suggested that the pain was due to inflammation and enlargement of the lymphatic glands in the abdomen.

Diagnosis.—G. Richardson[6] has published the results of an inquiry into a *cutaneous reaction* in scarlet fever which was first described by Rumpel and Leede.[7] The reaction is as follows: "A domette bandage is tied tightly round the arm immediately above the elbow, the correct pressure being such that the pulse is just perceptible at the wrist. The bandage remains *in situ* for five to fifteen minutes; and at the end of that time, if it has been properly applied, the arm should be markedly cyanosed. Should the arm become a dead mottled white, the reaction will not be obtained, and in such a case the bandage must be removed, a few seconds allowed for the reactionary hyperæmia to become re-established, and then reapplied. In cold weather the reaction is sometimes difficult to obtain, and in every case the arm should be kept warm. . . . The bandage having been removed, the skin at the fold of the elbow on the side distal to where the bandage has been is examined for the reaction. This consists in the appearance of a widely varying number of minute petechial hæmorrhages, fairly deeply situated, which do not disappear on pressure, and are, in fact, made much more evident by stretching the skin. The typical reaction is one where the petechiæ are fairly numerous immediately distal to the bandage, but become fewer and more scattered the further down the arm one goes, the entire area covered being rather more than that of the antecubital fossa; no reaction is seen on the extensor surface of the arm in the ordinary case."

Richardson states that he satisfied himself in the first instance that the reaction was invariably present in scarlet fever by trying it in 200 undoubted cases, and obtaining a positive result in every one. In order to get the reaction, the rash must have appeared on the arms; after that it may be obtained for about a month, in complicated cases for a longer period. With a view to ascertaining how far the reaction was possible in cases other than scarlet fever, 13 normal persons, 22 cases of diphtheria, 10 of whooping-cough, 7 of chicken-pox, and 1 each of influenza, pneumonia, and acute tonsillitis, 55 cases in all, were subjected to it, and in no single case was a positive reaction obtained. But the results were different in persons who had previously suffered from rashes (other than that of scarlet fever). In 15 cases of measles, 7 were positive and 8 negative; but the evidence went to show that the reaction is not, as a rule, to be obtained in this disease soon after the disappearance of the rash. The same was observed in rubella, of which eight cases were tried; so also in drug, serum, and enema rashes. It would appear, therefore, that a positive result obtained while a scarlatiniform rash is actually present

is of no or little value in diagnosis; but if a positive result is obtained for several days after the rash has disappeared, the case should be regarded as one of scarlet fever.

TREATMENT.—More than two years ago Emil Reiss and Paul Jungmann[8] published an account of 12 cases of scarlet fever treated with the **Serum** of patients convalescent from that disease. Recently Richard Koch[9] has reported 28 additional cases. The serum was obtained from the blood of scarlet-fever cases during the third or fourth week from the beginning of the illness, and free from septic complications. The blood is taken under aseptic precautions and centrifugalized. The serum is tested by the Wassermann reaction to show freedom from syphilis, and bacteriologically to see that it is sterile. The serum of at least three convalescent patients should be mixed for use therapeutically. Five drops of 1–20 carbolic acid are added to each 50 c.c. of serum. The serum is injected intravenously in doses of 50 c.c. for children and 100 for adults. In very severe cases the dose must be repeated on the next, and even on later days. The authors state that the treatment is very efficacious for toxic cases. Septic cases, especially those secondarily infected with streptococci, are not at all, or only very slightly, relieved. Koch states that no cases of nephritis occurred in his series.

Writing on **Milne's Method** of dealing with scarlet fever, W. Robertson[10] states that his experience at the Leith Isolation Hospital did not support Milne's contention that in the case of patients treated in hospital, complications were avoided, the stay of the patient in hospital curtailed, and 'return cases' reduced in number. This opinion coincides with that of John Taylor,[11] medical superintendent of the Elgin Isolation Hospital, who, in his annual report for 1913, found that the treatment did not exercise the slightest influence on the course, progress, duration, or termination of the disease; nor did it prevent it being communicated to others, that is, in the hospital. On the other hand, Robertson speaks favourably of the method when it is applied to cases treated at home. He states that it was tried in 100 such cases, and the results were compared with those obtained in 100 home cases not so treated. Amongst the latter there were seven secondary cases, while amongst the former there was only one.

E. C. Schultze and L. A. Goldberger[12] report a series of 128 cases of scarlet fever treated by **Vaccines** and Milne's method combined. In most of the cases they used a 5 per cent solution of carbolic acid in oil for swabbing the throat, instead of a 10 per cent as recommended by Milne, because they found that the latter caused carboluria. Two kinds of vaccines were used: *Micrococcus* '*S*' (described above), and a combination of this coccus with streptococci; 25 cases were treated with the combined vaccine, and 103 with *Mic.* '*S*' alone. The dosage was from 400 million to 2800 million; but in 121 cases one injection only of 400 million was found to be sufficient. They speak favourably of the treatment. There were 3 deaths

amongst the 128 cases, a fatality of 2·3 per cent; whereas amongst 354 cases treated in the same district on ordinary principles and without vaccines, there were 11 deaths, a fatality of 3·1 per cent. One of the three fatal of the authors' cases was moribund when vaccine treatment was begun, and succumbed to meningitis. Adenitis supervened in 5 per cent, nephritis in 5 per cent, otitis media in 2 per cent, and arthritis in 2 per cent of the cases. In seven cases diphtheria bacilli were found in the faucial exudate, and antitoxic serum was administered. The patients were treated in their own homes. They speak favourably of Milne's treatment as a means of preventing the spread of infection; but they do not state how many secondary cases of scarlet fever arose.

G. L. Kiefer and N. S. Ferry[13] have also used the vaccines in 106 cases of scarlet fever (*Micrococcus* '*S*,' streptococcus, and a mixture of the two). The best results seem to have been obtained with the streptococcus vaccine. The *Mic.* '*S*.' yielded no better results than did the ordinary treatment.

[With so few cases and with so mild a type of scarlet fever as is at present prevalent in most places, including New York, much caution must be exercised in drawing conclusions as to treatment.—E. W. G.]

L. Fischer[14] has treated 15 cases of septic scarlet fever with injections of **Neosalvarsan.** He states that it is easier to give it in small children by injection into the jugular vein than the median basilic. The usual dose was 0·2 gram of neosalvarsan dissolved in 20 to 40 c.c. of sterilized water. The drug appeared to have an antipyretic effect; but no other definite action was observed. No reaction, such as an acute febrile attack, shock, or rash followed the injection.

For *rhinorrhœa* and *excoriation of the nostrils* following scarlet fever, W. Wilson[15] recommends the following spray: **Menthol,** 5 gr.; **Camphor,** 3 gr.; **Chloretone,** 5 gr.; **Liquid Paraffin,** ad 1 oz. The external nares should be gently rubbed with a little compound **Resorcin** or **Boric Acid** (half strength) ointment.

References.—[1]*Lancet*, 1913, ii, 1538; [2]*Med. Rec.* 1910, Dec. 10; [3]*Ibid.* 1914, i, 934; [4]*Ibid.* 1899, 330; [5]*Petersb. med. Zeit.* 1913, Oct. (*Brit. Med. Jour.* Epit. 1914, i, 9); [6]*Edin. Med. Jour.* 1913, ii, 496; [7]*Münch. med. Woch.* 1911, Feb.; [8]*Deuts. Arch. f. klin. Med.* 1912, bd. 105; [9]*Münch. med. Woch.* 1913, 2611; [10]*Edin. Med. Jour.* 1914, i, 214; [11]*Med. Officer*, 1914, ii, 55; [12]*Med. Rec.* 1914, i, 931; [13]*Ibid.* 936; [14]*Amer. Med.* 1913, 584; [15]*Brit. Med. Jour.* 1914, ii, 1004.

SCHISTOSOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

D. Bovaird and R. L. Cecil[1] have closely studied two cases of schistosomiasis japonica seen in the United States, with an autopsy in one of them. The liver showed marked cirrhosis with numerous ova in it, and the mucous membrane of the ileum similar changes. The second patient had been infected in China, the ova being found in the fæces. A good account of the history and pathology of the disease is added.

R. G. Archibald[2] describes cases of intestinal schistosomiasis in the

Sudan which were characterized by fever of long duration and very obscure origin. The first two cases were closely investigated in hospital, including examination of the fæces for ova of the parasite, with negative results, and the true cause of the fever was only established by finding the parasites after death. In the third and fourth cases the ova were detected in the stools during life, and **Vaccines** of *Coli bacilli* were used, on the ground that the fever might be due to an infection through the ulcerated mucous membrane. In one case the fever was stopped by this treatment, and in another much reduced, and subsequently a proteus vaccine was used with good effect. The blood changes in this series of cases did not show any increase of the eosinophile leucocytes, but there was a slight degree of leucocytosis with a preponderance of polynuclears and large lymphocytes. Enlargement of the liver and spleen were marked features, and subsided to a considerable extent under the vaccine treatment. He suggests that other forms of splenomegaly may be due to coli infections.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1914, i, 187; [2]*Brit. Med. Jour.* 1914, i, 297.

SCIATICA. *Purves Stewart, M.D., F.R.C.P.*

Sciatica, or pain in the region of the sciatic nerve, is a clinical syndrome which may be due to various causes. In every case, then, it is our first duty to endeavour to identify the site of the underlying anatomical lesion, if any. Some cases are due to arthritic changes in or around the hip-joint, others to arthritis or other affection of the sacro-iliac joint, others again to lesions affecting the sacral plexus within the pelvis or even within the vertebral canal. The commonest cases are associated with an affection of the sciatic nerve trunk itself, at or near its exit from the pelvis through the sacro-sciatic foramen. It is for this latter class of case that the term 'sciatica' should be reserved, and a further subdivision should be into cases of sciatic neuralgia, where pain is the sole phenomenon, and those of sciatic neuritis, where sensory changes (in the form of cutaneous anæsthesia or hyperæsthesia) muscular wasting (in the calf or gluteal muscles) and diminution or loss of the ankle-jerk, afford evidence of a definite organic lesion.

TREATMENT.—A large proportion of cases of sciatica yield to comparatively simple measures, of which the most important are **Rest** in bed, sometimes with a **Splint** from axilla to heel, to immobilize the limb, which ought to be slightly flexed at the hip and knee, otherwise the strain of the extended position would be intolerable to the patient.

In cases where a long splint cannot be borne, **Sand-bags** may serve to keep the limb at rest. In addition to rest, **Salicylates** internally are efficacious in a large proportion of cases. To produce their effect they should be given boldly. Dercum[1] prescribes 10 to 20 gr. of **Sodium Salicylate** combined with **Sodium Bromide** 20 to 30 gr. every four hours for twenty-four to forty-eight hours. If well diluted, these large doses are easily tolerated. Soon the bromide and salicylate mixture can be reduced by one half and then rapidly discon-

tinued. If the pain is very acute at the outset, Dercum prescribes **Morphine** $\frac{1}{8}$ gr., with **Scopolamine** $\frac{1}{100}$ gr., hypodermically, to secure a night's sleep, but as a rule this is unnecessary.

In obstinate cases, resistant to rest and medicinal means, electrical treatment may be tried. Occasionally **Ionization** by means of a galvanic current is beneficial. Other cases are successfully attacked by a combination of **Radiant Light** and **Static Electricity.** The technique of this method, as described by Grace,[2] consists in identifying and marking the tender points along the line of the nerve-trunk. Each tender point is then exposed for twenty minutes to the rays of a 500-candle-power light, which produces hyperæmia of the skin, and probably of the deep tissues as well. After twenty minutes' exposure to radiant light, the patient is next placed on an insulated platform, and static sparks are applied by means of an easily-moulded soft metal electrode placed over the nerve-trunk, whilst the other terminal, by which the spark of the static machine is conducted, is directed to the tender point, gradually widening the gap from $\frac{1}{2}$ in. up to 4 or 5 in., and giving about 200 sparks per minute for twenty minutes or less. This treatment is repeated daily for a few days, then twice a week, and so on, gradually lengthening the intervals between the séances.

In cases where special electrical apparatus of this sort is not available, or where it has failed to produce a cure, we are justified in employing **Injections** of remedial substances directly into the nerve-trunk. Of these, sterile **Normal Saline** solution according to Lange's method is as good as any. It should be injected in large quantity—100 to 200 c.c. containing 0·1 per cent of β-eucaine. The technique of this injection, with its landmarks, etc., are described in the MEDICAL ANNUAL of 1910, *p.* 545. The beneficial effect of these injections is probably largely mechanical in nature, the saline solution distending the dense nerve sheath and infiltrating the connective-tissue spaces between the individual nerve bundles. It is essential for the success of the injection that the needle should actually penetrate the sciatic nerve trunk. In this way the injected fluid can be made to traverse the nerve both upwards and downwards, mechanically separating the nerve bundles. (*See also* vol. 1914, *p.* 501.)

In still more obstinate cases we are justified in **Operating** upon the nerve trunk in the gluteal region. Mere stretching of the nerve after exposure is not enough. It is better freely to incise the sheath longitudinally, as recommended by Heile,[3] of Wiesbaden, and to remove a considerable area of perineurium. Not infrequently, fibrous adhesions will be found between the perineurium and the nerve bundles within. These adhesions are separated, and then the nerve bundles are freed from interstitial tissue by means of fine forceps or blunt probes, carefully avoiding damage to the nerve fibres, until at last the nerve bundles are, as it were, disentangled and lie loose and free. Heile also introduces a finger upwards along the nerve trunk through the sciatic foramen into the pelvis to feel whether there is any mechanical pressure by abnormal strands of muscle (e.g. pyriformis) or by an

aberrant artery. Finally, before closing the wound, he injects saline solution within the nerve, both upwards and downwards. The foregoing operation is somewhat formidable, and Heile only advises it in cases where saline injections by themselves have failed to give relief.

REFERENCES.—[1]*Ther. Gaz.* 1914, 237 ; [2]*Lancet*, 1914, i, 102 ; [3]*Berl. klin. Woch.* 1914, 592.

SCLERITIS, BRAWNY. *A. Hugh Thompson, M.D.*

The condition illustrated in *Plate LII*, which is drawn from a case shown by Sydney Stephenson[1] to the Royal Society of Medicine, is a rare one ; but it is important to be able to recognize it, as it might be mistaken for a malignant tumour. Indeed, in more than one case an eye has been excised on this account. The few patients in whom the condition has been diagnosed have been elderly people, and the disease runs a very chronic course. A gelatinous and succulent infiltration affects some part of the anterior segment of one or both globes, between the attachment of the recti tendons and the cornea. At a later stage the infiltration may spread to the cornea. The causation is not known. In Stephenson's case, and a similar one of Lawford's, also shown at the Royal Society of Medicine,[2] the Wassermann reaction was negative. In diagnosing this condition it has to be distinguished from an intra-ocular growth and from a gummatous infiltration of the sclera. No treatment which has yet been adopted appears to have much effect ; but on the other hand, the pain and inconvenience caused to the patient do not seem as a rule to be great.

REFERENCES.—[1]*Ophthalmoscope*, 1914, 272 ; [2]*Proc. Roy. Soc. Med.* (Ophth. Sect.) 1914, Mar. 71.

SCLERODERMIA. *E. Graham Little, M.D., F.R.C.P.*

Byrom Bramwell[1] records 9 cases of diffuse sclerodermia, occurring in 27,000 cases of general medical diseases. He notes that this is a larger proportion than in a nearly equivalent number of general skin diseases, the comparison being made with the statistics of McCall Anderson and Crocker's practice. It is thus a very rare disease. All the more noteworthy is the curious fact that of Bramwell's nine cases, five occurred in stonemasons, and one in a coppersmith, both these craftsmen using a cold chisel in their work. In all of these six cases the condition commenced in the hands, and Bramwell suggests that the holding of the chisel in the hand in cold weather is a possible cause. He notes that sclerodermic patients are peculiarly subject to cold, and that the phenomena produced in this disease by cold resemble those of Raynaud's disease.

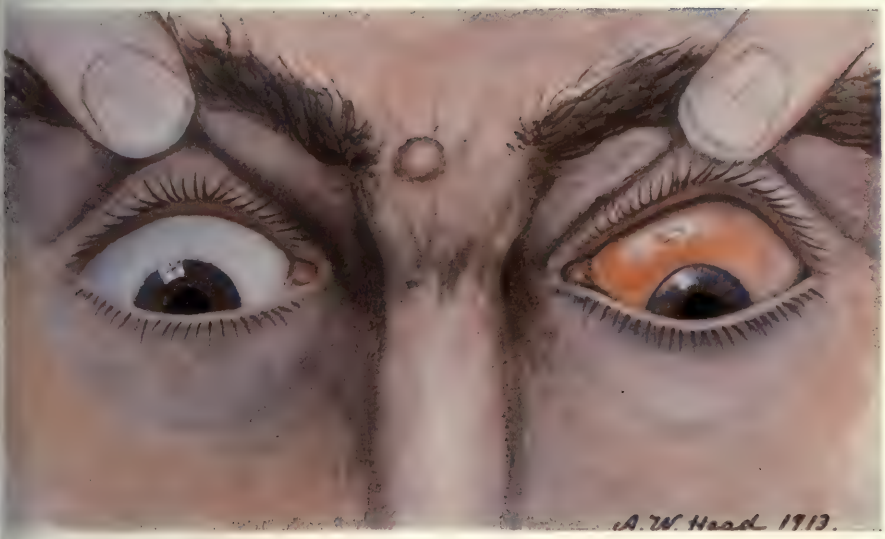
The treatment adopted in all the cases included **Massage, Passive Movements**, and maintaining the **Warmth** of the parts. Arsenic, iodide of potassium, and thyroid extract were used in several cases ; but the most consistent improvement resulted from injections of **Fibrolysin**, which were employed in three cases with marked benefit.

REFERENCE.—[1]*Edin. Med. Jour.* 1914, i, 387.

PLATE LII.

BRAWNY SCLERITIS

(Mr. Sydney Stephenson's Case.)



By kind permission of "The Ophthalmoscope."

SCLEROSIS, DISSEMINATED. *Purves Stewart, M.D., F.R.C.P.*

Etiology.—For some time past many neurologists have indicated the probability of a toxic origin for this disease, this supposition being supported by the course of the malady with its occasional long remissions and sudden relapses. Hitherto, however, experimental evidence has been wanting. Bullock[1] has recently published some important observations affording strong support to the theory of the toxic origin of the disease. By subcutaneous injection into rabbits of cerebrospinal fluid from a case of disseminated sclerosis, he succeeded in producing paralysis of the limbs in four rabbits out of five. The paralytic symptoms appeared in from twelve to twenty-one days after injection. In one rabbit the paralysis cleared up again after seven days, and did not reappear, despite re-inoculation with fresh cerebrospinal fluid from the same patient. Both filtered and unfiltered cerebrospinal fluid were efficient in inducing paralytic symptoms. Histological examination of the spinal cord showed areas of nerve degeneration, demonstrable by the Marchi and Weigert-Pal methods. Four other rabbits and a cat were inoculated with cerebrospinal fluid from a case of disseminated sclerosis, with negative results. Nevertheless, the positive findings in the other cases afford evidence in favour of the existence either of a filtrable virus or of a soluble poison in the cerebrospinal fluid. Further observations on the above lines will be awaited with interest.

Treatment.—Lyon Smith and Grainger Stewart[2] report a case of typical disseminated sclerosis in a young woman, aged 19, in whom the cerebrospinal fluid showed a lymphocytosis of 50 cells per c.mm., and in which cultures from the fluid yielded a growth of *Staphylococcus aureus*. [Both these findings are unusual in disseminated sclerosis, where the cerebrospinal fluid is generally sterile and free from pleocytosis.—P. S.] A **Vaccine** was prepared from this culture, and was given at frequent intervals, at first daily, later every three days. The patient had begun to improve before lumbar puncture was done or the vaccine treatment had been commenced. After the treatment was initiated, the improvement continued with great rapidity, and at the end of a fortnight the patient, who had previously been unable to stand or walk, regained the power of walking, and could use her hands to feed herself, whilst the plantar reflexes, which had been extensor in type, were now flexor, and the abdominal reflexes, which were previously absent, had reappeared. The cerebrospinal fluid was not re-examined. [All this is very striking, but the experienced neurologist will be cautious before accepting the foregoing case as one of cure by vaccine therapy. Not only was the condition of the cerebrospinal fluid distinctly unusual for disseminated sclerosis, but as Grainger Stewart himself is careful to point out, the tendency towards spontaneous remissions and apparent recovery in early disseminated sclerosis is so familiar that it is impossible to claim that the improvement in this case was more than a coincidence, or that it was due to the vaccine treatment.—P. S.]

References.—[1]*Lancet*, 1913, ii, 1165; [2]*Brit. Med. Jour.* 1914, ii, 364.

SCOLIOSIS. *F. W. Goyder, F.R.C.S.*

Whitman,[1] discussing the present position of treatment for this condition, says that cases can now be improved or cured that formerly were not susceptible to improvement or cure, since methods have become more efficient; the changes incidental to deformity, even of long standing, are less resistant than was formerly believed. Abbott[2] considers that as lateral curvature is a flexion deformity, rotation should be more easily reduced in flexion than in extension. Deformity should be corrected before functional activity is permitted. Whitman thinks that when this principle is generally accepted, corrective treatment will be applied at a time when it may be effective, and gymnastic exercises, now a futile routine, will find their proper place in the prevention of deformity, and as a necessary adjunct in the after-treatment.

Fig. 88.—Showing window cut over formerly depressed ribs.

Fig. 89.—Windows cut for the insertion of felt to make lateral pressure.

Working on these lines, Abbott has evolved the following plan of treatment (*Figs.* 88–91. These illustrations have been kindly lent by *Surgery, Gynæcology, and Obstetrics*): The deformity is corrected as far as possible in the position of flexion. A plaster jacket is applied, and pads of felt are gradually inserted through windows until the maximum amount of correction in the plaster is obtained. Windows are also cut over the concavities. A fresh plaster is then applied with the correction maintained, and pads applied at intervals until, finally, the deformity is over-corrected, and the spine has a bend in the direction opposite to that before treatment. Full over-correction is maintained for about four months, when the plaster corset is replaced by one of celluloid, and exercises are begun.

Whitman, however, says: "Many cases in young subjects, particularly the high dorsal curves with sharp backward angulation of the ribs, can neither be cured nor greatly improved; and certain deformities of the more common type of rachitic origin are, in adolescence, almost equally resistant. Lateral curvature of the moderate grades can be much improved, or eventually cured, the most favourable class being the long dorsal curves with but slight compensation. In certain cases of this type, the deformity may be rapidly over-corrected, according to photographic and *x*-ray evidence; but it will relapse with far greater rapidity when the support is removed. Again, whereas other forms of treatment have the advantage of immediately improving the patient's appearance and carriage, this produces a noticeable and even a grotesque deformity. Furthermore, the treatment is always uncomfortable and often painful." Judging from Abbott's photographs the results seem excellent.

Fig. 90.—Windows cut for the insertion of felt to remove rotation.

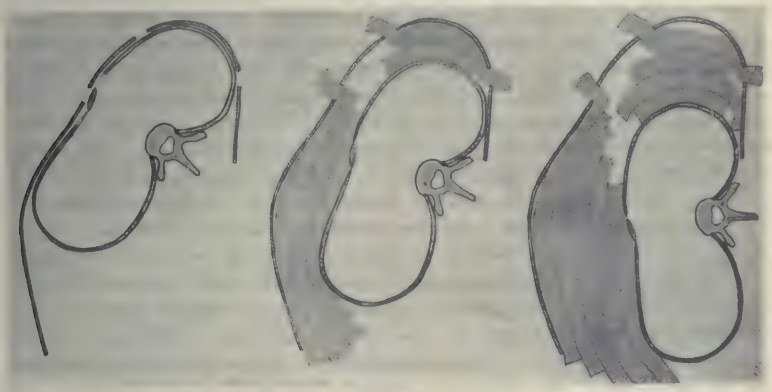


Fig. 91.—Diagrammatic illustration showing how felt is inserted through window.

An interesting account, showing the present methods at the scoliosis clinic at Boston, U.S.A., is given by Sever.[3] He groups his cases as follows:—

1. Postural deformities (round back, round hollow back, forward

shoulders) are cured by exercises alone with comparative ease, except in cases where the mental development is poor.

2. Functional, false, or physiological scoliosis, if neglected, is likely to develop into structural scoliosis; it requires only exercises and drills, with long periods of rest. Jackets are inadvisable, because the muscular development is usually bad. Attention to the clothing is important.

3. Of deformities of the thorax, pigeon and funnel chest, breathing exercises in early cases may cure the former, but even with the help of these, the latter condition is almost incurable.

4. Structural scoliosis. In 122 out of 460 cases a short leg required attention. In slight cases, bilateral exercises are first given to produce flexibility; later, asymmetrical exercises are given four times weekly to correct the spinal deformity. If no progress is made, a removable jacket is fitted, and the exercises are continued. In moderately severe cases, jackets, fixed or removable, are used, with or without exercises. Sever believes that jackets are best applied in the erect position, with head extension and careful pelvic fitting. A plaster torso is made from the cast, and further corrected by shaving on the side of rotation and adding over the concavities. If windows are made in the positive, this is not necessary. If improvement is taking place under exercises, a jacket must be replaced by a new one in six weeks. Plaster jackets should be worn for two years, followed by a brace, leather jacket, or reinforced corset, for as long as necessary.

Of 55 cases treated, 2 were cured, 15 markedly improved, 28 moderately improved, and 10 unaltered. Only slight and moderate cases are suitable for a removable jacket. Severe cases require fixed jackets, and the methods of Abbott or Forbes are used. Sever thinks that Abbott's method is wrong in principle, because a side pull is used to correct the deviation of the spine, and a rotatory force to the high side of the chest in front, the high shoulder being carried backwards and downwards, and the low forwards and upwards. When standing, the patients are in a flexed forward position. Forbes applies rotation without pull to correct lateral deviation. He forces the forward and high shoulder back, and the low shoulder forward, twisting the trunk back against the deformity. Both methods produce about equal results, but Sever finds that although the shape of the thorax is remodelled, there is no great change in the vertebræ themselves, nor in actual deviation of the spine. He believes that the erect position gives most mechanical advantage in correction, and does not increase the lumbar curve as does the flexed one. After a series of fixed jackets, removable ones are applied. Congenital scoliosis is treated in the same way. In empyema, jacket treatment is not curative, but prevents the progress of the deformity. In scoliosis due to infantile palsy, removable leather or plaster jackets have to be worn permanently; early treatment is advisable, as the deformity is progressive.

In opposition to the increasing popularity of mechanical support, P. B. Roth[4] reiterates his eminently commonsense views regarding treatment, and his belief in the futility of jackets. He claims that

once there is structural deformity of the ribs it cannot be got rid of. The patient is placed by the surgeon in the best possible position, standing erect, head straight, shoulders level and drawn back, chest out, abdomen in, and arms stretched down. If a good position can be maintained even for a short time, the final result should be good. The whole aim of treatment, and the utmost that can be expected from it, is to make this best possible position into the habitual one, and this can be done in 83 per cent of cases, while increase of deformity can be prevented in 93 per cent.

Important points in the treatment are—

1. The patient's clothes, which need not be removed while exercising, must be made to fit while he is in the " best possible position " ; without this precaution, treatment is useless.

2. For one month symmetrical exercises of spinal and other muscles are performed, including the development of the thorax.

3. That position of the arms is then decided on, in which the spine looks straightest. Most exercises are done in this position daily by the surgeon for one to three months, and consist of carefully chosen movements, the patient and surgeon alternately resisting. The improved position must be maintained during the whole course of the treatment.

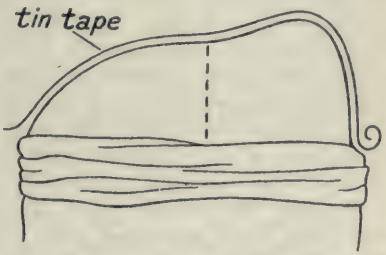


Fig. 92.—A patient with scoliosis standing with spine fully flexed, seen from behind.

4. Afterwards home treatment must be continued, at first for half an hour twice daily for six months, then once daily for a second six months, and finally, daily for twenty minutes for two years, or until growth has ceased.

The personal superintendence of the surgeon is the factor necessary for success. Careful observations are the only reliable criteria of the deformity and of its progress. Photographs alone are unreliable and misleading ; but accurate information is attainable by means of a malleable tin tape (see *Fig.* 92) in the following way : The patient, standing with feet together and knees straight, *completely* flexes the spine, the head and arms hanging down limply. The tape is then moulded transversely across the ribs posteriorly from the lower edge of one scapula to that of the other, and also midway between the twelfth rib and the iliac crests. A tracing of the moulded tape at each level is made on paper ; this is cut out with scissors and kept as a permanent record.

Albee[5] has devised for paralytic scoliosis, an operation to fix the transverse processes on the convex side by means of a bone graft. (*See* SPINAL CARIES.)

REFERENCES.—[1]*Surg. Gyn. and Obst.* 1913, ii, 145 ; [2]*Ibid*, 137 ; [3]*N.Y. Med. Jour.* 1914, ii, 1217 ; [4]*Clin. Jour.* 1914, 241 ; [5]*Surg. Gyn. and Obst.* 1914, i, 699.

SCROFULA.—(*See* TUBERCULOSIS IN CHILDHOOD).

SCURVY, INFANTILE. *Frederick Langmead, M.D., F.R.C.P.*

ETIOLOGY.—Although scurvy is less commonly met with in this country than formerly, the opposite appears to be true in Boston, where, according to Morse,[1] there has been a rapid and progressive increase in the number of cases attending the out-patient department of the Children's Hospital. Whilst cases of scurvy only formed 0·24 per cent of the total number in 1909, the percentage had risen to 0·87 per cent in 1913. Of a total of 89 cases of the disease which had been seen in the last ten years, details of the previous feeding were available in 58 : 54 of these were fed on foods which were not fresh—that is, containing either no milk or cooked milk—which is in accordance with the experience of English observers ; in 3 cases, however, feeding had been entirely by the breast. An enquiry into the reason for the increased incidence of the affection was not conclusive, but led to the suggestion that it was due to the introduction and progressive increase of the commercial pasteurization of milk.

DIAGNOSIS.—To the characteristic signs of infantile scurvy, Klotz and Riesenfeld, and later E. Fränkel, have added one obtained by *x* rays which they consider valuable. It consists in the presence in the negative of a white line at the end of the diaphysis. Talbot, Dodd, and Peterson[2] state that this may be seen before any of the cardinal symptoms of scurvy appear, and before the subperiosteal hæmorrhage. It also persists for six months after there is an apparent clinical cure. Following the procedures of Hölst, Fröhlich, and von Fürst, these observers have produced scurvy experimentally in the guinea-pig and the monkey. In the diseased animals also the white line was detected, and was seen under the microscope as a localized area of increased density.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1914, i, 504 ; [2]*Ibid.* 1913, ii, 232.

SEMINAL VESICLES, DISEASES OF.

J. W. Thomson Walker, M.B., F.R.C.S.

Quinby[1] reviews the anatomy and physiology of the seminal vesicles. The most important recent work on the anatomical varieties of these organs is that of Picker, who examined 150 subjects by injection of collargol or bismuth paste into the vas until the vesicles were moderately tense, and then examined them by dissection or the *x* ray. The following varieties were found : (1) Simple straight tubes, 3·5 per cent ; (2) Thick twisted coils, with or without very small diverticula, 15 per cent ; (3) Thin twisted tubes, with or without small diverticula, 15 per cent ; (4) Straight or twisted main channel, with large bulbous diverticula, 33 per cent ; (5) Short main channel, large branching irregular accessory channels, 33 per cent. The seminal vesicles are both secretory organs and reservoirs for the semen. The function of the accessory sexual glands, of which the seminal vesicle is one, is to add certain necessary constituents to this seminal fluid.

From the complicated system of convolutions of the vesicle, the author holds that massage of the seminal vesicles as a form of treatment for chronic inflammation is of little value, and lavage through the vas deferens, as introduced by Belfield, is preferable.

Dellinger Barney[2] adopts Belfield's method of injecting the seminal vesicle through an incision in the vas, and uses it as a method of diagnosis. In a case of urethritis or other chronic toxæmia, the question arises whether this is due to infection of the seminal vesicles. Where there is undoubted seminal vesiculitis and no other primary focus, the diagnosis is obvious, but in other cases the vesicles cannot be felt on account of their small size or of surrounding inflammation. In such cases the author isolates the vas by a small transverse incision near the top of the scrotum under local anæsthesia, and suspends it on a strand of silkworm gut. The vas is opened by a tiny longitudinal incision, and a drop or two of novocain are injected into its lumen. The patient is placed on the *x*-ray table and a small soft catheter inserted into the urethra with its eye just within the prostatic urethra. A 10 per cent filtered solution of collargol is injected into the lumen of the vas on each side and a radiogram taken, when the silkworm gut loops are removed and the vasa allowed to drop back into the scrotum. There may be some local reaction from the collargol infiltrating the tissues around the vas. "In most instances, especially where the vesicle was the undoubted factor, the urethritis has been temporarily improved to a greater or less degree, thus substantiating Belfield's observations." Nothing more definite than this is given by the author as a result of his studies by this method. The conclusion is that "radiograms with collargol seem already to demonstrate the presence of inflammatory changes, and their future as a diagnostic aid seems bright."

References.—[1]*Boston Med. and Surg. Jour.* 1914, ii, 58; [2]*Ibid.* 59.

SEPTICÆMIA, CUTANEOUS MANIFESTATIONS OF.

E. Graham Little, M.D., F.R.C.P.

Churchman[1] describes a case of streptococcic septicæmia following upon a comparatively trivial superficial injury to the scalp, and terminating fatally. A week after the initial injury, the patient, a Pole, addicted to excess of alcohol, began to have a high temperature, and to develop several vesicles on the fingers and feet. These matured very rapidly, and in some instances became filled with blood-stained fluid. *Streptococcus pyogenes* was isolated from the blood and from the vesicles, and the patient died from streptococcic septicæmia and double pneumonia seventy-two hours after admission.

Churchman summarizes the chief forms of eruption arising from septicæmia as follows: (1) Erythematous eruptions, such as the surgical scarlet fever of Paget; (2) Papular eruptions: this may be a primary form, or may succeed the erythematous stage: (3) Urticarial; (4) Hæmorrhagic. The lesions vary from minute petechiæ to extensive purpuric patches. Other tissues than the skin may

be affected as well, e.g., the retina. The prognosis in these cases is bad. Vesicular, pustular, and pemphigoid eruptions are less common. Herpes febrilis is infrequent in pyogenic septicæmia, a fact which contrasts with the frequent appearance of this symptom in typhoid, which is practically a septicæmia.

REFERENCE.—[1]*Amer. Jour. Med. Sci.* 1913, ii, 803.

SHOCK, SURGICAL. *A. Rendle Short, M.D., F.R.C.S.*

Concerning the strategic importance of a correct appreciation of the nature and means of prevention and treatment of surgical shock there can be no question. Some injuries and some diseases are, and probably always will be, essentially and necessarily fatal; but our instincts rebel, and rightly so, against the prospect of preventable death, and we feel that hæmorrhage, sepsis, and shock will one day be placed in that category. Our forbears have taught us how to avert the fatal issue from hæmorrhage and sepsis, provided that we get to the patient soon enough; ours is the problem of shock. Theories concerning its nature have oscillated a good deal of late years.

THE DIAGNOSIS OF SHOCK.—Under this heading we shall discuss, first, is the patient 'bad,' and secondly, is the 'bad' condition rightly called shock?

The question as to whether the patient is 'bad' arises principally after an injury, say a large shrapnel wound, a rifle bullet through the belly, or an extensive scald; or during and shortly after a major surgical operation. We all know the classical signs: the prostration and loss of muscular tone, the pallor, semi-consciousness, subnormal temperature, quick weak pulse, and lowered blood-pressure. If, with Crile and Mummery, we believe that exhaustion of the vaso-motor centre is the essential nature of shock, then the diagnosis is merely the estimation of the blood-pressure, and the sphygmomanometer is to shock what the thermometer is to fever—no fall of pressure, no shock. Herein lurks a deadly fallacy. There may be shock with a normal pulse and good blood-pressure. For several hours after the infliction of grave injuries causing rupture of various abdominal viscera, in a series studied by the writer, the pulse was often only 80, and of good quality. Lives have been lost from a false sense of security in consequence. Again, we all know of cases where, after a big operation, the patient has gone off the table with a good pulse; but in a few hours it has suddenly failed, and death occurs almost unexpectedly. We need therefore to pay attention to the signs of mental and physical exhaustion, and not to trust the pulse and blood-pressure alone. During an operation under anæsthesia, of course, these other signs fail us, and we *must* trust the pulse. The patient's condition is to be regarded as dangerous when the superficial temporal is no longer palpable, and when the frequency reaches 150. In calculating the length of procedure allowable, it is a useful rule to expect a rise of 1 beat a minute.

Is the condition of 'badness' rightly to be called shock? A bullet wound of the heart, a heavy blow on the head, avulsion of a limb by a shell, hæmorrhage from a severed artery, the exhaustion of poisoning by gaseous gangrene, a faint from terror—all these make the patient 'bad,' but not all are to be called shock. The heart is extraordinarily little liable to succumb to ill-usage; it will even beat after excision if suitably nourished; and death from a wound of the heart is due to mechanical compression of the auricles by blood in the pericardial sac, and could be cured by instant operation. This is not shock. 'Badness' from hæmorrhage or from toxæmia is termed collapse. It comes on more slowly than shock, though the symptoms are not distinguishable. Collapse includes such a variety of conditions that it cannot in every case be regarded as identical in its pathology with shock. Fainting is due to reflex stoppage or weakening of the heart through the vagus: this is not shock. It is quite possible that concussion and shock are identical.

Shock, then, is a condition of 'badness,' induced by injury, and producing its effects by nociceptive (= potentially painful) afferent impulses to the central nervous system.

The Pathology of Shock.—The prevention and treatment of such a condition must necessarily depend upon a correct pathology. Unfortunately, recent research has led to conflicting views upon the subject. The writer has been briefly attracted by, and has abandoned, four theories in turn. We have to find an explanation for the feeble, quick pulse, the falling blood-pressure, and the mental and physical prostration.

We may state at the outset that Boise's theory, that shock is due to primary cardiac failure, finds scant favour anywhere. As already stated, the healthy heart is extraordinarily well able to withstand ill-usage. The gallant way in which, in shock, it responds to the overload of an intravenous injection of saline, shows that the breakdown of the heart is not the first cause of the failing circulation.

The Exhausted Vasomotor Centre Theory of Crile and Mummery.—Physiology teaches us that the calibre of the arteries, and therefore the blood-pressure, is controlled, through the vasomotor nerves, by a vasomotor centre in the floor of the fourth ventricle, in the brain stem, and that this centre is normally sending out constrictor impulses all the time. According to the theory, surgical shock is due to exhaustion of this centre. Nociceptive (that is, painful or would-be-painful but for the anæsthetic) impulses cause reflex vasoconstriction by exciting the centre, until, exhausted by overaction, it is unable any longer to maintain its tonic vasoconstrictor influence over the vessels, and they fly open. Therefore the blood-pressure falls.

Now, we do not contend the statement that the vasomotor centre is depressed in shock, but it is no longer possible to believe that this depression is special to this centre and the prime cause of all the phenomena. There may be dangerous shock before the blood-pressure falls, as we have already seen, for instance, after a big operation. The

patient goes off the table with a normal blood-pressure and good pulse, but dies suddenly a few hours after.

Again, Crile himself points out that many injuries, such as crushing the testes, cause a fall of pressure without any previous rise to induce exhaustion.

Further, the physiological experiments of Porter, of Tyrrell Gray and Parsons, and of Seelig and Lyon (described in my Hunterian Lecture for 1914 on 'Surgical Shock') all demonstrate that the vasomotor centre is still quite efficient in extreme shock in animals.

Finally, as Malcolm has so long and earnestly contended, the condition of the arteries in human cases, during the severe operation, or after the smashing injury, is not one of dilatation, but of constriction. The skin is pale, the pulse small, bleeding is scanty, there is anuria (suggesting renal anæmia), the retinal vessels are contracted. Crile's autopsies on shocked animals revealed empty arteries.

This brings us face to face with the crucial paradox of surgical shock —how to account for a fall of blood-pressure with active heart and constricted arteries. The question is far more than an academic one. If shock is merely due to dilated arteries, it will be controlled by saline infusion, adrenalin, and pituitary extract.

The Acapnia Theory of Yandell Henderson.—Acapnia means absence of carbon dioxide. In a most thorough and painstaking series of experiments, Henderson, professor of physiology at Yale University, has worked out a theory of shock, deriving it from lack of carbon dioxide in the blood. The sequence is as follows :—

1. A severe injury, such as a bullet traversing the peritoneal cavity, causes hyperpnœa from pain, this being a reflex phenomenon.

2. Hyperpnœa leads to exhalation of carbon dioxide, and consequent acapnia of the blood.

3. According to Henderson, the venous pressure is controlled by the CO_2 content of the blood. Acapnia leads to dilatation of the veins.

4. Again, according to Henderson, acapnia leads to oligæmia, that is, to diminution in the bulk of the blood by excessive transudation to the tissues.

5. Therefore, owing to the oligæmia and the accumulation of the blood in the dilated great veins, the right side of the heart is not properly fed with blood, the output consequently falls, and there is a low arterial blood-pressure leading to a fatal termination.

The fundamental experiments on which this theory is based are these. Extreme shock (or a condition resembling shock) may be induced in animals merely by excessive ventilation when performing artificial respiration. Long and severe operations, which ought to induce shock, do not do so if the animal is kept semi-asphyxiated. Animals in shock may be revived by transfusion with saline saturated with carbon dioxide.

The objection to the acapnia theory is that the evidence is too artificial. In human surgery, hyperpnœa from pain does not appear

to be a sufficient cause to effect reduction of the CO_2 from 50 per cent down to 10 per cent in the blood, as in Henderson's shocked animals. Under anæsthesia by Clover's inhaler, on this theory, shock would never occur, which is unfortunately not true. I have made repeated estimations of carbon dioxide in the blood of patients suffering from surgical shock caused in many different ways, without finding any reduction below the normal. Janeway and Ewing show that excessive pulmonary ventilation in animals induces shock, even if the supply of CO_2 is kept up to the normal, so that acapnia cannot be the cause.

It will be no use, then, to trust to carbon-dioxide inhalation to cure shock, and we must again face our crucial paradox of a falling blood-pressure with active heart and constricted arteries.

The Oligæmia Theory of Cobbett and Vale.—It is very tempting to conclude that shock is due to a diminution in the total volume of the blood owing to excessive transudation of fluid out from the vessels to the tissues. This would explain our paradox, and provide us with an easy and effectual treatment, namely, saline transfusion. A few observations by Cobbett, Vale, Roy, and Sherrington appeared to demonstrate the oligæmia by finding a rise of the specific gravity of the blood in shock.

I have made a large number of estimations of the specific gravity of the blood in patients with mild, severe, or fatal shock. There is no constant alteration in the total blood-volume. An exception must be made in the case of severe burns. Here there is a marked rise of specific gravity corresponding to loss of fluid, amounting to a quart or more. There is therefore clear indication for the administration of saline fluid in such cases.

The Adrenalin Exhaustion Theory.—We know that the suprarenal glands are continually pouring adrenalin into the blood, that reflex nervous impulses increase the output, and that adrenalin is the necessary link between the vasoconstrictor nerve and the arterial muscle; if the adrenalin is absent, the nerve fails to constrict the muscle, as in Addison's disease. Might not shock be a condition of bankruptcy of the suprarenals from excessive output? In that case, adrenalin administration would save the situation.

Attractive as the theory may be, it will not stand critical investigation. I could find no constant deficiency in the adrenalin-content of the glands in patients dead of surgical shock, as compared with those of sufferers from various medical diseases.

What, then, is the nature of surgical shock? Once more we have to face our critical problem, the falling blood-pressure with a good heart, constricted arteries, and full blood-volume.

There is, in animals and man, a condition called *spinal shock*. In man it may follow such an injury as may be caused by the collapse of a trench; for a day or two the legs are paralyzed, toneless, anæsthetic, and without reflexes, and the sphincters are relaxed; then, unexpectedly, complete recovery occurs. In monkeys, after section of

the cord just below the brachial plexus, exactly this condition ensues in the legs, but not in the arms. If when the reflexes return, a second section is made in the mid-dorsal region, there is no repetition of the spinal shock. Therefore it was due to the cutting off of influences descending from the brain. If the mid-brain (mesencephalon) is divided, spinal shock does not occur. Therefore the influences, the loss of which is so deleterious, come from the region of the fourth ventricle. From this region, also, the influences descend which control muscular tone.

When the voluntary muscles are paralyzed, as by curare, blood-pressure falls, although curare does not act on nerve-endings in involuntary muscle. The reason is that by the loss of muscular tone the veins lose an important support, dilate, and become reservoirs of more or less stagnant blood. It is highly significant that in shock the deep muscle-supported veins in the limbs and abdomen are dilated ; the subcutaneous veins are drained empty.

In my opinion the cause of surgical shock is paralysis of the great nerve-cell groups about the fourth ventricle, including, it may be, the vasomotor centre, leading to mental and physical prostration, tonelessness, and, owing to the atony of the voluntary muscles, pooling of the blood in the great deep veins, inefficient filling of the right heart, reduced output by the left ventricle, and consequently constricted arteries and eventually a low blood-pressure or sudden death. Thus we can explain the low pressure in spite of strong heart, contracted arteries, and normal blood-volume. Here also we find an explanation for the absent knee-jerks and other reflexes in severe shock—they are absent just as they would be in spinal shock, from failure of impulses descending from the great nerve-centres of the fourth ventricle.

And can we identify these nerve-centres ? Probably, with further research, we shall be able to do so. When a nerve-cell is functionally bankrupt, temporarily or permanently, it suffers dissipation of its Nissl granules. In a patient who died of violence I have found, and demonstrated again and again at scientific meetings, disappearance of the granules in the cells of the gracile, cuneate, and lateral vestibular (Deiter's) nuclei. Dolley and Crile, and Tyrrell Gray and Parsons, have found similar changes. The exact distribution remains to be worked out.

The Treatment of Shock.—Unhappily, our study has not encouraged us to hope for much from treatment. If the theories passed in review were correct, we could have done something. We could have raised the blood-pressure, given CO_2, or transfused with saline or adrenalin. But what can one do to cure exhausted nerve-cells ? It is true that we can and ought to find means to remedy the stagnation in the great veins and consequent low blood-pressure, by firmly bandaging the limbs and elevating the foot of the bed, and applying a tight abdominal binder. Saline transfusion helps to keep up the output from the heart, but it has dangers of its own (œdema of the lungs, fever), and not more than one to two pints should be given,

and the water ought to be twice distilled. American writers claim on experimental grounds that sodium bicarbonate does better than sodium chloride.

Crile and Mummery teach that strychnine and alcohol do more harm than good, and this is probably true. Alcohol is particularly harmful if the patient has had a good deal of ether or chloroform. All these drugs briefly stimulate and then depress the central nervous system; they in effect whip a tired horse. The stimulating effect of the anæsthetic having already passed off will not be revived by the allied chemical, alcohol. According to Crile, strychnine induces shock even apart from trauma.

Adrenalin transfusion, heartily commended by these two experimenters, is to be regarded with caution. After chloroform, it is absolutely taboo, owing to the deadly nature of the adrenalin-chloroform combination both in animals and man. Adrenalin given to normal persons often induces alarming faintness.

It is very difficult to be sure how far pituitary extract helps in shock. Opinion differs very much. Not more than one dose must be given, or the effect is reversed. Digitalin has some advocates. Personally, I do not hope for much from any of these drugs in shock. If the patient is in pain, morphia is the best remedy. A little alcohol may help a patient who is more frightened than hurt.

Prevention of Shock.—We owe a great debt to Crile for his contributions to the much more hopeful subject, how to prevent shock, by what he calls anoci-association. His conception is that the general anæsthetics, though they may protect the cortex cerebri from painful impulses, leave the lower centres, those around the fourth ventricle for instance, exposed to nociceptive messages. The anæsthetics themselves cause similar changes in nerve-cells, the exception being nitrous-oxide-oxygen, which is therefore the anæsthetic of choice. The surgeon ought to cut everything and tear nothing; Crile protests, with good cause, against what he calls 'carnivorous surgery.' The sensory nerves of the injured part are to be blocked, before section in an operation, or as soon as the patient is seen in traumatic cases, by injection with novocain solution. This is not always possible in practice. The peritoneum, wherever cut or injured, is to be bathed with novocain, or with quinine and urea hydrochloride, which is longer lasting but rather apt to cause sloughing and sepsis of the tissues. Intraspinal anæsthesia is probably a good protection against shock.

There is no doubt that the use of these methods, when practicable, helps to avert shock, and also promotes the patient's post-operative comfort, especially by avoiding what the Americans expressively call 'gas-pains.' Novocain, being practically non-poisonous, may well be applied to large wounds in war causing shock from pain and laceration of the tissues. It may usefully be followed by painting with anæsthesin dissolved in spirit. The spirit is painful for the moment, but the anæsthesin abolishes pain for two or three days.

SHOULDER, PAINFUL AFFECTIONS OF.

Herbert French, M.D., F.R.C.P.

Buckley[1] draws attention to the fact that a comparatively common but generally unrecognized cause of painful affection of the shoulder is inflammation of the bursa beneath the acromial process—a condition to which he gives the name *subacromial bursitis*. Patients suffering from this affection have great difficulty in raising the arm for such purposes as doing up the hair or the necktie, and it also pains them much to put the arm behind the back. On examination, it is found that the scapula moves with the humerus when the arm is abducted from the side, just as though there were fixation within the glenoid cavity. On this account the affection has often been diagnosed as arthritis or periarthritis of the shoulder-joint. An important diagnostic point on which he lays stress is Dawbarn's sign, i.e., if the point of the shoulder is carefully palpated whilst the patient's arm is at the side, an acutely tender spot will be found just beneath the outer end of the acromial process, whilst if the arm be now abducted from the side as far as the patient will allow—and this is generally not much on account of the pain produced—pressure over this spot will be no longer painful. The explanation of this sign appears to be that the inflamed subacromial bursa is touched when the arm is adducted to the chest wall, but when the arm is abducted the bursa is carried further in under the acromial process, so that palpation no longer elicits tenderness. Another point is, that on *x*-ray examination, whereas the glenoid joint looks perfectly normal, there is an increased width of space between the acromial arch and the head of the humerus. The muscles round the shoulder-joint may be much wasted, either from disuse, or from a reflex trophic effect analogous to that seen in acute synovitis of the knee, so that it may sometimes be difficult to make sure that there is not a pathological neuritis. The affection is comparable to housemaid's knee in its pathology, the inflammation of the subacromial bursa being the result of recurrent small injuries or strains, either direct or indirect. The condition may develop in a very troublesome form as the result of golf or shooting. It is important not to mistake it for infective synovitis or arthritis.

Treatment.—**Immobilization** of the part is necessary in the acuter stages; as inflammation in the bursa subsides, massage and carefully regulated movements, always stopping short of such exercise as will cause a recrudescence of the inflammation, are indicated.

In the treatment of painful shoulder, Grace[2] has found very pronounced benefit from the use of **Static Electricity** applied locally, and it seems probable that similar treatment would be beneficial in the relief of pain and fixation in various chronic arthritic states. The tender points are sought out with a vacuum tube attached to one pole of the static machine, using a spark-gap of 1 in. or thereabouts. The patient will promptly point them out when tested by this method if they are superficial. Deeper points may be sought for by putting a

metal plate about 3 in. square connected to one pole of the static machine on the part suspected, and using a slowly interrupted spark-gap of about ½ in. to begin with, gradually increasing the length to 3 or 4 in. This method takes time, but does not alarm the patient, as the following method may: The insulated platform on which the patient is seated is connected to the negative side of the static machine. The positive side is grounded. Another ground chain is connected to a ball electrode held by a vulcanite handle in the hand of the operator. If the ball electrode be now approached to within 2 in. of the suspected point, a spark will leave the patient at the point. This is very searching, and will disclose tender points not found by the vacuum method; but, as the sensation is unpleasant, it cannot be used on everyone.

Treatment consists first of exposure to the rays of the 500-candle-power lamp for thirty minutes if the condition is very acute, or for about twenty minutes if it is chronic. The lamp Grace used was a single one in a reflector with a carbon filament, as this gives the largest amount of the violet and ultra-violet rays at present obtainable, combined with the smallest proportionate amount of heat rays. The skin becomes reddened, and pain is relieved, whether owing to counter-irritation or to some other effect Grace is unable to say. He thinks it probable that the immediate effect is due to counter-irritation; but the ultimate effect is due to absorption of light by the deeper tissues where it is converted into heat, leading to hyperæmia and an increased flow of lymph, so that plastic exudates are carried away. Next, the patient is seated on the insulated platform of the static machine. The pliable metal electrode before referred to is moulded over the tender point and kept in good contact; otherwise sparking from it to the skin will give rise to pain and irritation. This electrode is connected to the positive side of the machine, and the negative grounded. Opening the spark-gap very gently a point is reached where at each crossing of the gap by the spark the patient feels a sensation like a gentle tap on a bruise. It is not advisable to increase the strength of the current beyond this. At each treatment the spark-gap can be widened until at last a gap of 5 or 6 in. may be tolerated, the break causing contraction of all the muscles in the neighbourhood of the electrode. When this point is reached, or before, the patient has generally lost his pain and regained the complete use of his arm. If there is any limitation of movement due to pain or stiffness, Grace usually asks the patient to put the arm in the position which causes the pain, and applies a few static sparks to the painful spot. After a dozen or so of such sparks the patient will generally find that his movements are freer and more comfortable, and, though the sparks are not very pleasant, he will often ask to have them repeated, pointing out suitable places for the application. Treatment is usually given daily until substantial improvement is shown, then three times a week until it can be discontinued.

The rapid alternation of contraction and relaxation, about 200

times a minute, in using the static wave current, doubtless causes increased blood-circulation through the part, leading to resolution of exudates and recovery.

REFERENCES.—[1]*Pract.* 1914, i, 777 ; [2]*Brit. Med. Jour.* 1914, i, 1012.

SKIN DISEASES, GENERAL THERAPEUTICS.

E. Graham Little, M.D., F.R.C.P.

Carbon-dioxide Freezing. — Bunch[1] gives some detailed recommendations as to the use of freezing methods in the treatment of *nævi*, *rodent ulcers*, and other diseases of the skin. In making the application, the treatment should be directed to include a margin of healthy skin of about 2 mm. all round. One application is sufficient for stellate or small angiomatous nævi as a rule ; but for *pigmentary nævi* it is better to do shorter and more frequently repeated treatments. For hairy pigmented nævi, the method of destroying the hair with the electric needle, and then applying snow, and radium as well in cases in which pigment is excessive, is recommended. For port-wine stains, snow combined with the application of radium is also recommended. For nævolipomata and fibromata, freezing the surface, and destruction of the mass of the tumour with electrolysis conducted by needles plunged into the middle of the swelling, is advised. Liquid air has advantage over snow in the fact that it has a temperature more than twice as cold, and consequently its application is much shorter in duration, ten seconds being about a maximum dose. The author does not like the method of using carbon-dioxide snow dissolved in ether, and restricts its use to extensive cases of lupus erythematosus, where diminution of vascularity rather than any deep action is aimed at.

For rodent ulcer, the method advised for ulcers the size of a half-crown or larger, is to apply the solid stick of snow for forty seconds at the first sitting, and a second application of thirty seconds a week later. The ulcer is then dressed with boric ointment, and usually heals within three weeks. Monthly inspections of the ulcer's treated surface are advisable, so that any recurrence can at once be tackled. The author regards this method as being at least as satisfactory as any other, comparison being made with the results obtained by radium, *x* rays, and ionization. The author regards freezing as being less satisfactory in the treatment of lupus vulgaris than other means at our disposal. For chronic isolated patches of *psoriasis*, *eczema*, *lichen planus*, and for *corns* and *warts*, it is very useful. In the latter two forms of disease the exposure must be prolonged and complete destruction secured. If pain is excessive, as it sometimes is in the case of corns situated over tense fascia, as on the sole of the foot, local injection of novocain is desirable. Healing of indolent *chronic ulcers* may be hastened by short applications of freezing, light pressure for twenty seconds being all that is necessary.

Radium.— Simpson[2] considers that radium reactions are much more benign than the effects produced by *x* rays, and when destructive

inflammation has been caused, healing is more certain and rapid. He prefers fractional doses to the massive treatment recommended in many quarters. The majority of cases of *epithelioma* of the skin react well to radium, and the cosmetic result with this treatment is excellent. In lupus erythematosus, especially of the fixed variety, encouraging improvement was obtained. The use of screens is to be recommended. For the reduction of vascular *nævi*, both cavernous and flat, radium offers the treatment of election. Its painlessness makes it especially adapted to children. Port-wine stains, the most intractable form, require repeated applications, pushed to the point of production of a marked erythema with desquamation. With a $\frac{1}{20}$-strength applicator screened with 0·01 mm. aluminium, the proper degree of reaction can be obtained in about four or five hours. Elevated papillomatous nævi require stronger doses, without screening. The large cavernous type of tumour is conveniently treated with the method known as cross-fire, two applicators being placed at the same time on different surfaces of the swelling.

Holding[3] compares the relative value of methods of treatment by radium, *x* rays, and other physical applications. The costliness of radium and the time consumed in application, militate heavily against it. It is of special value in the treatment of diseases of metabolism, in which emanations are used, and in the treatment of malignant lesions of cavities. Benign growths can be more easily and effectively dealt with by means of *x* rays, electric desiccation, etc.

Vaccine Therapy.—Gilchrist,[4] who was one of the earliest users of vaccine therapy in the United States, gives a useful record of his personal experience. In *acne* he finds, contrary to the usual statement, that a stock vaccine is as efficacious as an autogenous one. He prefers a dose of from 10 to 20 million given every eight days for three or four injections, when a rest is advised. If a relapse occurs after this interval, two similar injections are given. If there is pustulation, he uses the *Staphylococcus albus* in preference to the *S. aureus*. He also found *S. albus* useful in *dermatitis herpetiformis*, and in *erythema multiforme bullosum*. A filtrate from a three-months-old culture of blastomyces was given in doses of 1 c.c. to commence with every two or three days, in a case of severe blastomycosis. The dose was pushed to 10 c.c. without producing a negative phase and with benefit to the patient. Ointments made up with a cold-cream base containing 10 per cent of *S. albus* were tried with a number of skin diseases, and seemed to give relief in two cases of very intractable pruritus ani; but the results are too uncertain to afford any reason to recommend these methods at present.

Tuberculin.—MacKee[5] reports a series of observations, covering four years of use, of bacillary emulsion. The initial dose must be very small, and must be gradually increased. The best diluent is sodium chloride 8·5, carbolic acid 5, distilled water to 1000. A scheme was followed by which the next higher dose was fixed by multiplying the last dose by the constant 1·25, commencing with a

dose of 0·5 c.c. of a solution of 1–50,000. Injections were given every five to seven days, and continued until cure was effected or local reaction at the site of injection occurred, in which event the treatment was intermitted for a few weeks and taken up again with smaller doses. The cases reported, 52 in number, comprised several varieties of tuberculous disease, and included 12 cases of lupus vulgaris and 12 of papulo-necrotic tuberculide. In the latter, and in six cases of lupus erythematosus, there was no result even after treatment prolonged for two years. Ulcerative lupus also failed to respond, but 'apple-jelly' lupus and warty and hypertrophic forms did well. In eight cases of *Bazin's disease* a cure resulted in all, with a subsequent slight relapse in one case.

Autoserum Injections.—Gottheil and Satenstein[6] contribute the result of an experimental trial of this method in six cases of *psoriasis* and six cases of *eczema*, two of *pemphigus* and one of *leprosy*. The psoriasis and eczema received autogenous serum, the pemphigus and leprosy cases that of relatives. The injections were given once a week, three to four intravenous administrations of from 20 to 30 c.c. in the case of the eczema and psoriasis, and local treatment was not commenced until the injections had ceased. The pemphigus and leprosy required more numerous doses. The serum was not deactivated, being administered within three hours of being drawn. Local treatment with ointments containing from 3 to 5 per cent chrysarobin were used at the end of the course for an average period of six days. The method seemed to succeed best with the case of psoriasis. Great improvement was noted with the cases of eczema. The single experiment with leprosy resulted in marked and rapid benefit. The cases of pemphigus did not react at all. It is claimed for the method that it shortens the stay in hospital of patients with chronic diseases such as psoriasis, as the giving of the injections does not necessitate retention as in-patients.

Chrysarobin.—A good formula for its use is the following (McMurtry[7]) :—

℞	Chrysarobini	5·0	Ichthyolis	20·0
	Acidi Salicyli	10·0	Ung. Simpl.	ad 100·0
	Ol. Cadini	15·0		

Misce.

Or it may be incorporated in a mass which is sufficiently stiff to allow of pencils being made of it, e.g. :—

℞	Chrysarobini	30·0	Ceræ Flavæ	35·0
	Colophonii	5·0	Ol. Olivæ	30·0

Misce.

This is a convenient form for treatment of small areas. The action may be intensified by painting the deposit made on the skin with traumaticin, or covering it with zinc plaster.

A mixture of 5 per cent chrysarobin in gelanthum is recommended in the treatment of *vitiligo*. In the form of pencils it may be rubbed on the patches of *alopecia areata*. In 10 per cent plaster it will be

found useful in treating patches of resistant *eczema* and hypertrophic *lichen planus*. Where *x* rays are unprocurable or otherwise contra-indicated, it has a field in the treatment of *ringworm*, in the form of an ointment such as the first formula above. This should be rubbed into the scalp, which is covered with a cap. Application is renewed daily for four days, and then a salve of ichthyol substituted for a week, when chrysarobin is again put on. Hairs should be examined frequently for fungus, the disappearance of which will announce the termination of treatment.

During prolonged use of chrysarobin the *urine* should be examined at frequent intervals, and the drug stopped as soon as signs of renal irritation appear. Attempts should always be first made with small percentages, which may be cautiously increased if not effective. Adjuvants of chrysarobin which are profitably combined with it are salicylic acid, ichthyol, tar, resorcin, acetic acid, and soft soap. It should not be prescribed in anæmic or nephritic cases, and with great caution in children. When dermatitis occurs from its use, the surface should be rapidly cleansed from the drug by anointing with oil or vaseline, and soothing lotions and dusting powders applied. Where conjunctivitis is caused by accidental contamination of the eye, this should be treated by rest in bed, avoidance of light, and frequently renewed compresses of cold boric-acid solution. The risks of its use in out-patient practice are considerable, and would be lessened by the issue of directions such as the following:—

"*Instructions to Patients using Chrysarobin.*—The ointment which you are to use for your skin disease is very powerful in action, and must be employed with great care. It stains underwear, clothing, bed clothes, and towels purple, and this stain is extremely difficult to remove. Hence you should use only such old underclothing, bed linen, etc., as you may feel able to throw away when your skin disease is cured. The ointment will also discolour you hair and your finger nails, if rubbed into them. You should therefore buy a pair of rubber gloves, and put these on before rubbing in the salve. If you use your bare hands, these must be thoroughly scrubbed in soap and warm water immediately afterwards. If the least bit of the ointment be rubbed into your eyes, it will cause an extremely severe inflammation, which will keep you from your work, cause you much suffering, and oblige you to immediately call a doctor to treat you. Do not keep this ointment where children can find it, as dangerous accidents might result."

Dymal,[8] which is a by-product in the manufacture of gas mantles, and consists of salicylates of didymium, lanthanum, and cerium, is recommended by Marshall as an *antiseptic dusting powder*, which might with advantage replace iodoform, for it is free from the objectionable smell of the latter and is much cheaper. It can also be used in ointment, and dymal lanolin forms a useful protective dressing to which other drugs can be added.

Ichthyol.—In the last volume of the MEDICAL ANNUAL reference

was made to a paper by McMurtry on this drug. In a second article[9] this author continues the consideration of its effects in *eczema*, in which it is almost always used in conjunction with other agents, rarely alone. A serviceable prescription for more chronic forms of eczema is the following :—

℞	Ichthyolis		Adip. Lanæ Hyd.	
	Acidi Salicyli		Vaselini	āā ad 100
	Ol. Cadini	āā 5		

In *ulcers of the leg*, a 10 per cent ichthyol vaseline, or Lassar's paste to which 10 per cent of ichthyol and 10 per cent of sulphur are added, may prove useful.

In *anal fissures*, these should be anæsthetized with cocaine, and painted with pure ichthyol daily, the stools being kept soft. From twelve to twenty applications may be required. Since ichthyol is devoid of toxic properties, one seldom meets with contraindications to its use. In acute inflammatory conditions, watery solutions of 1 to 3 per cent are advised, but for antipruritic effects a much stronger proportion, at least 15 to 50 per cent, is demanded. Probably the drug is most commonly prescribed in too small proportions. The effect of watery solutions is intensified if the parts are covered with oil-silk.

Varnishes form a clean and valuable means of application. Two formulæ are given. The film may be removed with water.

℞	Ichthyol		Concent. Albumin Sol.	1·5
	Starch	āā 40·0	Water	to 100·0
℞	Ichthyol	25·0	Starch	50·0
	Carbolic Acid	2·5	Water	22·5

These varnishes require ten minutes to dry, and sulphur, resorcin, or chrysarobin, etc., may be added to them.

Ichthyol soaps in strengths of 10 to 20 per cent are useful in *acne*, *pruritus*, and *rosacea*. It is to be applied as a thick lather, which must be left *in situ* for a certain time.

Ichthyol may also be used in the form of a powder in *burns* and *acute inflammations* : Ichthyol 2, peroxide 5, carbonate of magnesia 10.

For internal administration, doses of 15 to 45 gr. per diem are usual, but the latter limit may well be exceeded. If given in the form of pills, with a coating which does not dissolve until it arrives at the intestine, the inconvenient belching which often follows when the drug is taken by the mouth, may be avoided. The odour may be best disguised with mirbane 40 per cent, cumarin 2 per cent, oil of wintergreen 2 per cent, oil of bergamot 2 per cent, or phenol ½ to 1 per cent. Stains of linen may be removed with soft soap ; discolorations of the skin caused by ichthyol are best treated by rubbing with rectified petroleum, and washing with soap and water.

REFERENCES.—[1]*Brit. Med. Jour.* 1913, ii, 1006 ; [2]*Jour. Amer. Med. Assoc.* 1914, ii, 737 ; [3]*Ibid.* 741 ; [4]*Jour. Cutan. Dis.* 1913, 977 ; [5]*Ibid.* 1914, 366 ; [6]*Med. Rec.* 1914, i, 620 ; [7]*Jour. Cutan. Dis.* 1913, 1022 ; [8]*Med. Press and Circ.* 1914, i, 360 ; [9]*Jour. Cutan. Dis.* 1913, ii, 765.

SKULL INJURIES. (*See* BRAIN, SURGERY OF.)

For technique of radiographic diagnosis, *see p.* 57.

SLEEPING SICKNESS. (*See* TRYPANOSOMIASIS.)

SMALL-POX. *E. W. Goodall, M.D.*

ETIOLOGY.—The epidemic of small-pox which broke out in New South Wales, in May, 1913, and continued for the rest of the year, presented points of more than usual interest, which have been well brought out in a paper by Armstrong,[1] the senior Medical Officer of Public Health of New South Wales. The occurrence of small-pox in Sydney was first brought to the knowledge of the authorities on May 30, 1913, by the owner and manager of an underclothing factory. He reported that a number of his employees had, during April and May, suffered from unusual rashes, which appeared to be infectious. The factory was at once visited by a medical officer, who learned "that between April 20 and the end of May, a number of young women employed in the factory had suffered with slight eruptions, for the most part on the face, but also extending to other parts of the body. In each case the eruption had been preceded by an attack of so-called 'influenza,' in which the most prominent symptoms had been headache, vertigo, shivering, and general pains. In some of the cases there had been backache, and in a few there had also been some vomiting, usually slight." None of the patients had ever been vaccinated; in all cases the illness had been very mild; indeed, not more than two of the patients had consulted a medical man.

Further inquiry elicited the information that the first case in the factory occurred on or about April 25, in a girl, E. D., age 22, and that she had caught the disease from a young man, B. E., ship's steward employed on a vessel called the *Zealandia*, which had left Vancouver on March 19, arriving at Sydney on April 12. B. E. was taken ill on April 4, with severe headache, pains in the stomach, and great weakness; but he was not seen by the ship's surgeon. On April 9 his face 'broke out' in pimples, which had not disappeared when he reached Sydney. When seen on June 26 there were on his forehead six shallow, depressed cicatrices, and several smaller ones on the cheeks. Nearly all the employees at the factory mentioned above, who stated that they had been affected by the eruption, showed small stains, dried scales, and, in a few instances, very shallow depressed cicatrices on some parts of their bodies.

On May 30 one of the employees was admitted to the West Hospital, Little Bay, with a copious rash on the face, body, and limbs. Next day, after consultation, three medical men pronounced the disease to be chicken-pox. It was not until June 18, when a relatively severe case occurred in the Sydney Hospital, that serious doubts arose as to the nature of what had been regarded as varicella. In order, if possible, to settle the question, on June 18 and 19 six persons who had never been vaccinated, but who were known to have suffered from the supposed varicella, allowed themselves to be vaccinated. At the

same time, as a control experiment, other persons who had neither been previously vaccinated nor suffered from the doubtful disease, were vaccinated with the same lymph as was used for the six persons above mentioned. "The results of this experiment were very definite. None of the six persons who had been attacked by the illness reacted to the vaccination, while all the controls developed perfect vaccination lesions within the usual time." This and other similar evidence convinced the authorities that they had to deal with small-pox. Up to Dec. 31, 1913, there were 1070 cases, and of these only one was fatal, a woman who died of collapse two and a half hours after parturition, while suffering from small-pox.

The chief peculiarity of the epidemic was the mildness of the cases. This was 'natural,' for only about 6 per cent of the persons attacked had previously been vaccinated. Armstrong points out that in 1896 a very mild type of small-pox began to prevail in the south of the United States, and gradually spread over the whole country to Canada. In 1902 it invaded the island of Trinidad. In 1911 it was present in North Carolina, where Chapin reported 3294 cases without a single death. In the early months of 1913 it was prevalent in British Columbia, at the time when B. E., the steward of the *Zealandia*, left Vancouver for Sydney.

As has been already noticed, the disease was at first mistaken, in Sydney, for influenza or for chicken-pox. But the writer points out, in discussing the diagnosis, that in the majority of the cases the distribution of the eruption, scanty as this often was, conformed to the usual distribution in small-pox of a more severe type. In a few rare instances the face was unaffected. As regards the character of the pocks, "in the overwhelming majority of our cases, the regular stages of development of the lesion were obliterated, or nearly so, and the whole period of evolution was much shortened. Often the first sign of the rash was an outcrop of pimples on the nose or forehead, which acquired pustular heads within a few hours, and sometimes the changes were so rapid that the lesions seemed almost to make their first appearance as pustules. They exhibited a strong tendency to appear in crops." The proportion of small and abortive pocks was larger than is usual. The lesions were more superficial than in ordinary small-pox, though less so than in chicken-pox, a fact which, the writer states, accounted for the sinuous, jagged outline and oval shape of the lesions which were so often seen, especially on the trunk. In nearly every case there was no secondary fever.

The epidemic afforded a striking instance of the value of vaccination, as the following facts testify. The staff employed at the Quarantine Hospital, where nearly all the Metropolitan patients were treated, numbered 52. All of them were successfully vaccinated or revaccinated at the outbreak of the epidemic, and none of them contracted small-pox. The staff employed by the New South Wales Health Department, who came into dangerous relationship with cases of infectious disease, including the one in question, numbered 50

(medical officers, sanitary inspectors, disinfecting porters, and nurses). "The whole of this staff were successfully vaccinated or revaccinated at the beginning of the epidemic, excepting one member of the disinfecting staff. He had never been vaccinated in his life, and he alone of the whole of the two staffs contracted small-pox." In respect of the patients, it was found that of 1070 persons attacked up to Dec. 31, 1913, in this epidemic, 69, or 6·4 per cent, had probably been vaccinated in infancy, or over thirteen years before being attacked; 999, or 93·3 per cent, had never been successfully vaccinated before contracting small-pox. There were two other patients who were said to have been successfully done within two months of contracting small-pox, but who presented scars which were not of such a nature as to indicate successful vaccination.

Armstrong draws attention to what is known as the 'mulberry' reaction which occasionally follows vaccination or revaccination, and was described by Seheult in his account of the Trinidad epidemic. This is a slight and very much modified reaction, and consists in the delayed appearance at the site of inoculation of a red mulberry excrescence, which either dries up without any further development, or eventually results in ill-developed vesicles, often containing some blood. There is an absence of the inflammatory zone round the vesicles, and usually there is a lack of constitutional symptoms. When the vesicle dries up, it forms a thin scale, which, on falling off, leaves a small red excrescence, which gradually becomes absorbed. No cicatrix results, but the skin remains stained for some weeks. The 'mulberry' reaction may occur not only in a person who has previously had small-pox and who is vaccinated with efficacious lymph, but in persons who have previously had neither small-pox nor vaccinia. Persons who present a 'mulberry' reaction after a primary vaccination are not proof against small-pox or vaccinia. It would therefore appear that the reaction is due to a defective character of the lymph.

Armstrong draws attention to the low infectivity of the disease in this epidemic, as shown by its slow spread in an almost entirely unvaccinated population. Attention has been drawn to this epidemic at some length, because it is not at all improbable that small-pox of the same mild type might be introduced into the British Islands, and give rise to the same trouble in diagnosis as occurred in Sydney.

Diagnosis.—In an article on small-pox in infants and children, William Hanna,[2] in discussing the question of diagnosis, states that *scabies* "frequently simulates small-pox, especially in bad cases where there is bullous impetigo or eczematous surfaces, caused by scratching, and in those where some of the lesions occur on the face, to be found more commonly in babies at the breast. The presence of itching, however, and the polymorphous character of the eruption, will easily guide one."

He also draws attention to another disease, not common in the British Islands, which simulates small-pox and chicken-pox. It is known as '*straw itch*' (dermatitis schambergi), and is due to a small

mite which infects grain and straw. It occurs chiefly in the United States. The eruption consists of wheals, surmounted by vesicles and pustules. They are most abundant on the trunk, and scanty on the face and extremities.

TREATMENT.—R. Denman[3] reports that he has had considerable success with **Electrargol** in the treatment of small-pox (in an epidemic in the Mauritius), and gives the following figures in support of his belief. Of 94 cases of confluent small-pox treated on the ordinary lines without electrargol, 65 died, a fatality of 69·1 per cent; while of 136 similar cases treated with electrargol, 21 died, a fatality of 11·4 per cent. Of 9 cases of hæmorrhagic small-pox treated without electrargol, 8 died, a fatality of 88·8 per cent, while of 20 treated with electrargol, 5 died, a fatality of 25·0 per cent. The drug was given by intravenous injections in quantities increasing up to 50 c.c. every twenty-four hours for three days.

REFERENCES.—[1]*Austral. Med. Gaz.* 1914, 381, and *Proc. Roy. Soc. Med.* (Sect. of Epidem.), viii, 1; [2]*Brit. Jour. Child. Dis.* 1914, 1; [3]*Brit. Med. Jour.* 1914, i, 1236.

SOROCHÉ. (*See* MOUNTAIN SICKNESS.)

SPINAL CORD, SURGERY OF. *E. W. Hey Groves, M.S., F.R.C.S.*

Bullet Wounds of the Spine.—The importance of these injuries is almost entirely related to the degree of injury of the spinal cord. When the bullet lodges in a vertebra or passes through the spine without injuring the cord, no special treatment is required, and impacted bullets should be left alone. But it is quite otherwise when paraplegia is present. Careful consideration must be given to the following questions: (1) Has there been an organic lesion of the cord, or are the symptoms attributable merely to concussion? In the latter case improvement will begin to be manifest within a few days. (2) Is the lesion a complete severance of the cord, or only a partial interference with its function by the pressure of bone particles? It is useless to operate when the cord is completely divided, and the opening up of a bullet wound involves a great risk of septic infection of the meninges.

Wallace[1] discusses the various symptoms which indicate the existence, position, and degree of spinal-cord injury, and he relates three interesting cases of recent gunshot wounds of the spine which were treated by immediate laminectomy. The first was a man, age 29, who had a bullet embedded in the transverse process of the eighth dorsal vertebra, with paralysis of the legs, associated with severe pain and involuntary spasms. The bullet was removed; but the dura, being only slightly lacerated, was not cut open. He made a rapid recovery. The second case was that of a woman, age 38, with a bullet wound of the twelfth dorsal vertebra. She only had motor weakness, hyperæsthesia, and pain in the legs. The bullet lay outside the spine, amidst the shattered fragments of the transverse process. The loose particles of bone and the bullet were removed, and she

quickly recovered. In the third case, a woman of 22 was shot through the sternum, and the bullet lodged in the uppermost lumbar vertebra. She had complete paraplegia, which began to improve, but eighteen months later the laminæ of the twelfth dorsal and upper three lumbar vertebræ were removed because of great callus thickening. After this, both movement and sensation returned.

Spina Bifida.—As in other congenital maldevelopments of the nervous system, spina bifida is an unsatisfactory condition for treatment. Plastic operations may be devised by which the gap in the spine is filled up, but this leaves untouched the essential error in the structure of the cord and its membranes, and the symptoms which arise from these will continue unabated. This is the main theme of Froelich[2] in his work on this subject. He gives five typical cases in which either the gross deformity had been successfully cured or else was quite trivial, and in which, nevertheless, the various trophic and paralytic symptoms subsequently developed. Of 14 cases operated upon during infancy, 5 died within a few days of bronchopneumonia or convulsions; 4 died within one year, 2 from hydrocephalus and 2 from gangrene of the feet. Of the 5 survivors, only 1 is healthy; 2 suffer from hydrocephalus and 2 from motor and trophic paralysis. These results compare unfavourably, especially as regards mortality, with those obtained by the same surgeon by purely expectant methods. Therefore, operation should never be undertaken for spina bifida unless enlargement and ulceration of the tumour threaten rupture. It is unwise to base a good prognosis on the simple nature of the tumour. Even cases of simple meningocele develop serious cord symptoms, and these may also occur in spina bifida occulta.

Paraplegia Resulting from Spinal Caries.—Tietze,[3] reporting his experiences, considers that operation should only be done in those cases which have resisted all other forms of treatment. In a series of 13 cases, 5 died as the result of the laminectomy, and in the remaining 8, only 3 recovered from the paralysis. Considering the nature of the disease and the dangers of the operation, he advises that it should be confined to laminectomy, and that no attempt should be made to find or expose the focus of bone disease. For these reasons also he condemns the operation of costotransversectomy. The object of the operation should be merely relief of pressure on the cord, and not an eradication of the bony disease.

Tumours of the Spinal Cord.—Beyond the record of individual cases, there has not been much new work on this subject. Elsberg's[4] observations still remain the most important recent discoveries in this field. This surgeon, after noticing the spontaneous extrusion of an intramedullary growth from the cord after an exploratory incision, was led to propose the deliberate incision of the cord in all such cases. After one week, the wound is re-opened, and in many cases it will be found that the tumour has extruded itself upon the surface and can be removed quite easily. The spinal cord can be incised through its posterior columns in a longitudinal direction with impunity, and the

spontaneous extrusion of a growth causes no damage to the nerve structures such as would be involved in an immediate operative excision. He relates the history of 11 cases in which this method was adopted. Of these, 7 recovered or were greatly improved. Only those cases died where the growth was of a diffuse character extending upwards into the medulla. In no case were the nervous symptoms made worse.

Clarke and Lansdown[5] relate a case where an intramedullary tumour of the cord was treated by **Radium** with great promise of success. The patient, a woman, age 25, had for five months had various paræsthesiæ, and for three months paraplegia. Severe pain occurred in the lumbar region and in the legs. There was frequent micturition with retention. The cerebrospinal fluid showed a marked pigmentation with lutein. A laminectomy of two lower dorsal and two upper lumbar vertebræ revealed an intramedullary tumour of the conus about 1½ in. long. This was not touched, but two months later 50 mgrams of radium were placed outside the dura mater and removed after twenty-two hours. Within one month she showed marked improvement both of movement and sensation, but died a few weeks later as the result of a virulent *B. coli* cystitis.

A case of Mauss[6] forms a comparison with that just cited. It also affected a woman of middle age, and was exactly similar in position, with the all-important exception that it was extramedullary instead of intramedullary. The history was much longer (two years), and there was a notable predominance of pain over paralytic phenomena. This pain was distinctly worse on one side than the other. All these are points so typical of the differentiation of extra- from intramedullary tumour of the cord, that the carefully described cases should be read side by side.

Resection of the Posterior Nerve Roots.—A series of 58 cases of this operation are contributed by various authors[7] in the form of a collective report. The majority of these are new and unpublished records, and enable a very accurate estimate to be made as to the risks and results of the method. In *cerebral spastic paralysis* the cases were mostly of Little's disease, 34 in number, of which 22 were improved, 8 unaltered, and 4 died. The fact that in lateral sclerosis of cerebral origin this operation can only be an amelioration, and not a cure, is to be carefully noted. Perhaps the two most important facts bearing on the prognosis are the mental condition of the child and the care taken in the after-treatment. As to which roots should be divided, it seems clear at the outset that spasm of the arm is much more difficult to cure than that of the leg. In the lower limb, two-thirds of the lumbar and sacral roots ought to be divided, but otherwise there does not seem to be any advantage in careful identification of special roots. In *spinal spastic paralysis* there were 4 cases, with relief in all, death in none, and restoration of walking in 1 only. In the *gastric crises of tabes* there were 5 cases, with 2 failures but no deaths. In one of the unsuccessful cases, it is clear that as only

two roots were cut, no permanent benefit could be expected. In the relief of *pain*, there are 15 cases, in 1 of which the operation was abandoned before completion ; 2 died, one at the time and one a month later. Of the remaining 12, 8 were cured and 4 were unrelieved. There are two great factors which make for success when the posterior spinal roots are divided for pain. One is that the pain must be very definitely limited to the area of supply by certain nerve roots, and the other that two roots above and two below the affected segments shall be cut. Thus, the possibility of curing diffuse pain in an amputation stump is not good.

In the 58 completed operations there were 6 deaths, a proportion which corresponds very closely to the 26 deaths in 267 cases recorded or collected by Foerster ; 3 of the deaths were due to shock, and 3 to meningitis. It is argued from the facts of these cases, that it is not necessary to identify all the exposed roots exactly. This being so, the exposure of the end of the cord and the beginning of the cauda equina by removal of the last two dorsal and the upper two lumbar laminæ, is greatly to be preferred to the removal of all the lumbar laminæ. The latter operation, which has been done chiefly on the Continent, has for its object the enumeration of the roots as they leave the spinal canal ; but it is a much more difficult and severe operation than the higher laminectomy, and it leaves a wound much more likely to be contaminated by urine.

It is remarkable how very little injurious anæsthesia results from even extensive nerve-root resection, and there is no record of any trophic ulceration of skin. In one case, a patient who had had all her lumbar and the upper sacral nerves divided for neuralgia, sustained a spontaneous supramalleolar fracture, which was subsequently plated without anæsthetic.

References.—[1]*Jour. Amer. Med. Assoc.* Ap. 1914, 1073 ; [2]*Med. Press*, Nov. 1913, 496 ; [3]*Berl. klin. Woch.* June, 1914, 1205 ; [4]*Surg. Gyn. Obst.* Feb. 1914, 110 ; [5]*Brit. Med. Jour.* 1914, i, 1009 ; [6]*Münch. med. Woch.* June, 1941, 1451 ; [7]*Brit. Jour. Surg.*, Collective Report on Rhizotomy, 1914, 205.

SPINE, CARIES OF. (*See also* Tuberculosis, Surgical.)

F. W. Goyder, F.R.C.S.

Albee[1] gives his technique in employing autogenous bone-grafts for Pott's disease, for which condition he has performed 178 operations. He claims that his method corrects the kyphosis in suitable cases, and prevents the progress of the deformity in the others, since it controls the lever action at the diseased vertebræ by preventing the separation of the posterior ends of the levers, which are the spinous processes. This prevents the approximation or crushing together of the anterior arms of the levers, which are the vertebral bodies. Crushing of the bodies due to the superincumbent weight, muscular spasm, and respiratory action are most important factors in prolonging the disease. He believes internal bony immobilization of a tuberculous joint, in conjunction with suitable régime, is the ideal treatment The bone-graft is indicated in all cases, at all ages, where pain or muscle

spasm demand immobilization, for the prevention and correction of increasing deformity, and is even more urgent in the presence of psoas spasm, cold abscess, or paraplegia. Following operation, the patient is kept on a fracture bed from six to eight weeks. After this he is allowed to walk about without apparatus for part of the day. The relief of pain and acute symptoms is most satisfactory. External spinal supports should be avoided. The prognosis is most favourable as to relief of all symptoms and increase of deformity. Correction of deformity is most frequent in early cases and in those of sharply angular curve, or where there is much mobility.

A similar method is used by Albee in paralytic scoliosis to fix the transverse processes of the convex side, and also in spina bifida. The technique of the operation is as follows :—

1. A curved incision exposes the tips of the spines of all the diseased, and if possible two sound, vertebral spines.

2. A vertical incision is made over each down to the bone, through the periosteum, and the interspinous ligaments are also split vertically.

3. With a thin sharp chisel the spines are split vertically to a depth of about half an inch, and greenstick fractures made, all on the same side. The separated halves leave a gutter into which the transplant is to be placed. A hot saline pack is then placed in the wound.

4. With the patient still in the prone position, the leg is flexed on the thigh, and an incision made over and down to the crest of the tibia.

5. From the crest and the antero-internal flat surface a rectangular-shaped strip, $\frac{1}{4}$ in. to $\frac{5}{8}$ in. broad, of tibia is removed with the motor saw, including periosteum, ' endosteum,' and attached marrow substance.

6. It is inserted between the halves of the interspinous ligaments and spines with its edge anterior or innermost, and its cut or marrow side in contact with the unbroken halves of the spinous processes.

7. It is fixed in position by interrupted sutures of kangaroo tendon passed through the interspinous ligaments, beginning at the centre of the graft.

8. The ligaments are then drawn over the insert posteriorly, by sutures placed close together ; the ends of the graft are rounded off dorsally before being buried.

Bascom Thomas[2] notches the transplant in three or four places to allow of bending, and drills a hole at each end. He fixes it by strong catgut or kangaroo tendon, and buries it under the paraspinous tissues with strong chromic catgut, closing the wound with tension sutures of silkworm gut and Michel's clips. He uses a chisel to remove the tibial graft. The patient is put on a Bradford frame, fixation being kept up for from three to ten months. He regards Albee's method as unsuitable for cervical and high dorsal disease ; in such cases he prefers Hibbs's operation, in which the base of a spinous process is fractured, denuded, and turned down into the space caused by the fracture and turning down of the spinous process below. If there is much destruction of bone, operation is valuable ; if there is much

ankylosis, it is unnecessary. If patients are likely to discontinue treatment early, or desire to shorten the duration of the disease, operation is advised. He concludes that it is not severe, that discharging sinuses not encroaching on the field of operation are not contra-indications, nor is every case of pulmonary tubercle. Paraplegia is not markedly improved. Young patients do best as a rule; Albee's is the method of choice in most cases. Unlike Albee, he thinks that months of perfect rest for the transplant should follow operation. Nutt[3] gives the results of fifteen cases. He finds that its claims have not been fully substantiated; that the results cannot be judged until two years have elapsed since operation; and that there is a danger in creating a sense of false security, and hence other therapeutic measures may be neglected. In the discussion following the delivery of this paper, Sayre notes that the curve, although diminished immediately after operation, often increased later, until ultimately it became greater than before. He advised lengthy after-treatment. Albee believed that this increase when it occurred was due to lack of growth of the unaffected vertebræ, and that this again was produced by prolonged mechanical support.

Don[4] points out that the treatment of *cervical caries* has always been unsatisfactory. Neither Albee's nor Hibbs's method is easy of application in this region. Don exposes the spines from below the seventh to above the second by a central incision, clears the periosteum from the seventh and the under side of the second spines, and packs the space with gauze to arrest bleeding. A piece of rib slightly too long, is excised subperiosteally from the side of the chest nearest to the operator. A hole is drilled in the wider end large enough to fit over the end of the seventh spine. When the piece is adjusted over the seventh spine with the convexity forwards, it is easy to mark and cut across at the point which will just fit into the groove below the second spine. A small hole for a suture is drilled in the upper end of the piece of rib. This is sutured to the interspinous ligaments and tendons between the second and first vertebræ or base of skull. Little depends on this suture, for the muscles and fasciæ when sutured together in closing the wound are sufficient to hold the rib in good position till healing takes place. If the disease is in the first or second vertebra, the rib should be long enough to be jammed against the base of the skull. The result was good in a case reported, though fixation could only be kept up for five weeks.

References.—[1]*Surg. Gyn. and Obst.* 1914, i, 699; [2]*Jour. Amer. Med Assoc.* 1914, i, 1064; [3]*Ibid.* 1913, ii, 1780; [4]*Brit. Med. Jour.* 1914, ii, 460.

SPINE, SYPHILIS OF. *F. W. Goyder, F.R.C.S.,*

Hunt[1] finds that in 100 cases of this rare condition, 25 per cent were associated with complications of the nervous system, either of the nerve roots or of the cord itself. It occurs by far the most frequently in the cervical region, the dorsal region is much less common, while the lumbar and sacral regions are rarely attacked. The process is

usually circumscribed ; in nearly half the cases a single vertebra is affected. Extension of gummata from the pharynx accounts for much of the preponderance of cervical cases. Exostoses, gummatous periostitis, and osteomyelitis, with occasional necrosis and sequestra, are the usual manifestations. Tendency to pus-formation is slight, and cold abscesses do not arise. It occurs almost invariably in the tertiary period. As in tubercle, pain, rigidity and deformity are the signs, but local tenderness is more marked, and nocturnal osteocopic pains more persistent and distressing. Fourteen cases presented the symptoms of compression myelitis. In nine, the symptoms were referred to a single limb. The author regards monoplegia as rare in tubercle but very suggestive of syphilis. The condition may simulate cervical pachymeningitis. The onset may be sudden, simulating an acute rheumatic affection, or gradual with a chronic and protracted course. Antisyphilitic treatment, especially **Iodides,** controls the disease.

REFERENCE.—[1]*Amer. Jour. Med. Sci.* 1914, ii, 164.

SPIROCHÆTOSIS, BRONCHIAL. *Sir Leonard Rogers, M.D., F.R.C.P.*

A. J. Chalmers and W. R. O'Farrell[1] have found this condition to be fairly common in Anglo-Egyptian Sudan. It was first clearly described in the tropics by Castellani in Ceylon. The spirochætes can best be seen by dark-ground illumination and stained by Leishman's method, and abound in the sputum during an attack only. The disease is infectious from one person to another, a mild attack of bronchitis with a tendency to relapse resulting. Leucocytosis may be present. It may be complicated by a pneumococcal infection. The disease is readily amenable to treatment, **Arsenic** associated with **Glycerophosphates** giving good results.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1913, 329.

SPLEEN, SURGERY OF. (*See also* ABDOMINAL INJURIES ; BANTI'S DISEASE ; SPLENOMEGALY.) *E. Wyllys Andrews, M.D. (Chicago).*

Finkelstein,[1] while practising in the Caucasus, operated upon 66 cases of diseases of the spleen. These serve to supplement the reports of Bland-Sutton and Owen Richards, of recent publication. The 66 cases included 3 stab wounds, 7 traumatic ruptures, 3 abscesses, 3 echinococcus cysts, 1 non-parasitic cyst, 1 sarcoma, 16 wandering spleens, 21 fixed malarial spleens, 8 fixed malarial spleens with ascites. The total mortality was 26. The literature of traumatic affections has been large, and the tendency has been to advise splenectomy in all cases of dangerous rupture or hæmorrhage. But this must be applied only when the organ is seriously lacerated. Michelson had already reported 240 splenectomies, 24 tamponades, 10 sutures, and 10 irregular methods, in 298 cases of ruptured spleen, with 199 recoveries and 99 deaths, 33·2 per cent mortality. In abscess of the spleen, great progress has been made, 55 operations being reported, with 13 deaths. Good results also have followed operation on echino-

coccus cysts. Non-parasitic cysts gave very satisfactory results with operation, only 7 deaths in 78 cases. In tumours, the number of operations is small. This includes cavernous angioma, sarcoma, and other growths, in all 35 cases, with 33 splenectomies, the organ remaining after removing the tumour in 2 only. Of this number, 7 died.

Operation for wandering spleen has been followed by good results. There were 77 cases, with 13 deaths. Favourable results are well known in splenectomy for Banti's disease, as shown by a large series of reported cases. Mayo has reported 18 cases of splenectomy for splenic anæmia without a death. Similar favourable reports are given of so-called Egyptian splenomegaly, which is similar to Banti's disease. In malarial fever, splenectomy has given quite satisfactory results. In 75 reported cases by six operators, the mortality is 26, or 34·7 per cent.

The technique of splenectomy is very simple when the organ is displaced, as it has a long pedicle. It is difficult when the spleen is fixed and adherent to the diaphragm. Kocher's rectangular incision is thought to be preferable. Of late, however, Finkelstein has used a pararectus incision, or one through the outer part of the rectus muscle.

REFERENCE.—[1]*Brit. Jour. Surg.* 1914, 68.

SPLENIC ANÆMIA. (*See* BANTI'S DISEASE.)

SPLENOMEGALY. (*See also* BANTI'S DISEASE.)

Herbert French, M.D., F.R.C.P.

Although the literature upon the subject of splenomegaly serves in the main merely to show how little is as yet really understood about the nature of the rarer types of disease in which enlargement of the spleen is the main symptom, certain definite types are becoming more and more clearly recognizable, and amongst these may be mentioned *Gaucher's disease*, a very full description of which is given by Brill and Mandelbaum.[1] The characteristic features are its incidence in childhood, its frequent presence in other members of the family of the same generation, a progressive increase in the size of the spleen, which often reaches colossal dimensions, followed by a similar huge enlargement of the liver, a characteristic brownish-yellow discoloration of the skin, usually restricted to the face, neck, and hands, a peculiar yellowish wedge-shaped thickening of the conjunctivæ commonly seen on both sides of the cornea, and the prolonged and chronic course of the disease, which does not materially disturb the patient's health. After the malady has been present for a considerable time, there is a definite tendency to hæmorrhages, appearing especially as epistaxis, bleeding from the gums, and ecchymoses in the skin following the slightest trauma. The positive finding in the blood, even in the early stage of the disease, is a definite leukopenia. The erythrocytes show no definite change either in number, form, size, or hæmoglobin content, until the disease has existed for a long time, when an anæmia of the chlorotic type, rarely pronounced at any stage, makes its appearance.

The disease is not accompanied by palpable enlargements of the superficial lymph-nodes. There is no jaundice, and ascites is exceptional. The disease has none of the characteristics of malignancy, and is usually terminated by some intercurrent affection. Its chief pathological feature is the presence in the spleen, liver, lymph-nodes, and bone-marrow of distinctive large cells, with characteristic cytoplasm and small nuclei. Whereas the nature and origin of these cells are still moot questions, the histological picture is uniformly characteristic, and pertains to no other form of disease. The enlargement of the spleen and liver is due to the presence of these cells in enormous numbers. In well-established cases all of these organs contain pigment giving the reaction for iron.

In the large majority of cases the beginning of the disease cannot be determined, because it starts insidiously, and is unattended by any subjective symptoms which might demand attention. After the disease has existed for some time and has given rise to a splenic enlargement, which in some patients may produce symptoms of discomfort or slight pain, it first begins to attract attention ; in others, in the course of a physical examination for some other condition, which may have no relation to the disease itself, a splenic hypertrophy is discovered. As a rule, the disease begins in early life—before the age of twelve in most cases, and in infancy or early childhood in several instances. Females are affected more frequently than males. In the fourteen reported cases, the disease occurred only twice in males. It often affects more than one child of the family. There seems to be no tendency to hereditary transmission, and in none of the established cases has either parent been affected. If one wishes to include those cases in the family which, from a clinical standpoint, have the same symptoms as the individual proved case, then the familial character has been noted seven times.

The splenic enlargement is one of the most important features of the disease. It is slowly progressive, occurs in every case, and gives rise to a distinct protrusion. The time required for the spleen to reach colossal proportions may be many years. The size may be greater than that in any other disease, not even excepting leukæmia. Enlargement of the liver seems to develop only after a considerable increase in size of the spleen has taken place. Its upper border may reach the fourth rib, and its lower border be felt 3 cm. below the umbilicus. Occasionally the splenic enlargement may so overlap the liver that the lower border of the latter can only be felt in the anterior axillary line and posteriorly. The surface is uniformly smooth.

Early in the disease the skin of the face and neck, as well as the hands, presents a peculiar discoloration. It is usually spoken of as a pigmentation, but it is rather a discoloration, uniform in distribution and intensity, and limited to the parts of the body exposed to light. In one case only has this been noted on the abdomen. The colour is a peculiar yellowish-brown (ochre). It frequently assumes a deeper shade across the bridge of the nose and around the eyes, and

after the disease has existed for a considerable time the discoloration becomes uniformly more intense. The skin often presents numerous ecchymoses, varying in size and colour, because the superficial vessels are particularly susceptible to damage from slight trauma. Furuncles assuming a hæmorrhagic character have been noted, and these on healing have left definite and permanent skin lesions of a dark pigmented nature. Some authors describe this specific discoloration as a jaundice or subicteric tint. Brill and Mandelbaum's analyses show an absence of bile in the blood and urine, with an excess, however, of urobilin in both. A tendency to general sweating associated with sudamina has been noted in a few cases.

A change in the conjunctiva of both eyes may be noted early in the disease. This manifests itself in a brownish-yellow wedge-shaped thickening, affecting first the nasal side of each conjunctiva, its base being limited by the cornea. Later on the temporal side also becomes the seat of a similar thickening. The development and growth of these thickenings are very slow. They seem to originate near the corneal margin, and extend in the process of growth to the inner and outer canthus respectively. They resemble in some respects the lesion of the conjunctiva known as pinguecula, and may reach dimensions of 3 mm. along the corneal margin and 5 mm. in length. Brill and Mandelbaum have seen no case of the disease in which this peculiar ocular lesion was absent, and therefore emphasize its diagnostic significance. There seems to be a tendency to bleeding from the mucous surfaces. Epistaxis is a frequent occurrence ; in some cases this is associated with bleeding from the gums, which are often swollen and spongy. Melæna and metrorrhagia have been observed.

An important positive feature is a leucopenia which appears early in the disease and persists throughout. As few as 500 leucocytes per c.mm. have been noted. The average count of all the reported cases is 4600. The differential count, using the average of all the authentic cases, is as follows : Polynuclears, 66 per cent ; small lymphocytes, 20 per cent ; large lymphocytes 13 per cent ; eosinophiles, 1 per cent. In two cases myelocytes were found, 2 per cent and 1 per cent respectively. Mast cells were also noted in two cases. It is remarkable that notwithstanding the fact that the disease involves the entire hæmopoietic system, its effect on the blood-forming organs should be attended by so little demonstrable change in the morphological characters of the blood. The number of erythrocytes is not materially diminished until the disease has existed for some years. The red-cell count for quite a long period is close to normal. Later in the disease a slow diminution takes place. In the advanced cases the average of all the reported counts is 3,700,000. As high as 6,000,000 red cells have been noted in one case. There seems to be a greater reduction in the hæmoglobin content than in the number of the red cells, giving rise to a low colour-index, and therefore a mild anæmia of the chlorotic type. The appearance does not suggest anæmia, because the skin of the majority of patients does not show an inordinate amount of pallor, nor do their

mucous membranes. There is little if any change in the contour, shape, or size of the red cells. The colour may be slightly paler than normal. In only two of the cases have nucleated forms been observed ; in these a solitary normoblast was seen in each. Megaloblasts have never been noted. The large specific type of cell, the so-called ' endothelial cell,' whose presence in all the hæmopoietic organs characterizes the disease, is never found in the peripheral circulation. The hæmoglobin shows a reduction before the red cells suffer any marked decrease. Its average in all the cases reported is 65 per cent.

The superficial lymph nodes of the body are not usually palpable. Where careful search is instituted, occasionally a few solitary lymph nodes in the axilla and in the groin may be felt as small, hard, pea-sized bodies. The peculiar brownish-yellow discoloration of the skin of those parts of the body which are exposed to light has been called jaundice by some writers. This is a misnomer, because bile pigment has not been found in the blood or urine. Ascites is almost invariably absent, even though the disease has existed for twenty-five years or more. In only one case has it been reported. After the spleen and the liver have grown to a large size, a few patients complain of abdominal pain, chiefly referable to the region of the spleen. This pain is not constant. It may be absent for many months before it is complained of again. During the period of pain, tenderness over parts of the spleen may be elicited. This would seem to be occasioned by the presence of local areas of perisplenitis. Pain and tenderness over the liver are only exceptionally present. The weight of the spleen and liver gives rise in a few patients to a sense of dragging discomfort in the abdomen. It is remarkable that notwithstanding the colossal size of the spleen and liver, there is very little complaint in the majority of the patients referable to these organs.

Very late in the disease, only after many years, some patients direct attention to pain in the lower ends of the femur and tibia, and still later, to pain and tenderness in the muscles of the thigh and calf. Bone tenderness over the sternum and tibia is absent. A remarkable feature is the preservation of a feeling of comparative comfort and well-being. As a rule, patients do not feel depressed, nor are their mental activities diminished. Most of the advanced cases present a loss of fat. The appearance of the patient, with the tremendously enlarged abdomen and the emaciated frame, makes a striking picture. In one case, a female adult, there was a total body weight of 89 lb.

The disease is essentially chronic ; its course is slow and progressive. One patient lived for thirty-six years after the disease was detected. The average duration of all the authentic reported cases, where death has not resulted from splenectomy, is 19·3 years. The disease is usually terminated by some intercurrent affection. A few of the reported causes of death are tuberculosis, pleurisy, and pericarditis. Operative procedure (splenectomy) has occasioned three deaths. Another patient died as the result of an accident causing a fracture of the skull and laceration of the brain.

Much speculation has been indulged in to explain the nature and origin of Gaucher's disease. When first described by Gaucher, its nature gave rise to considerable discussion, and it was considered by some to be a form of malignant disease. Later writers, taking into consideration its clinical course, its long duration, as well as its histological features, have justly disproved this assumption. Various theories have been offered, such as the influence of an endogenous toxin, of an enzyme manufactured by the spleen, infection by protozoa, tubercle bacilli, and the like. No evidence has ever been pre-

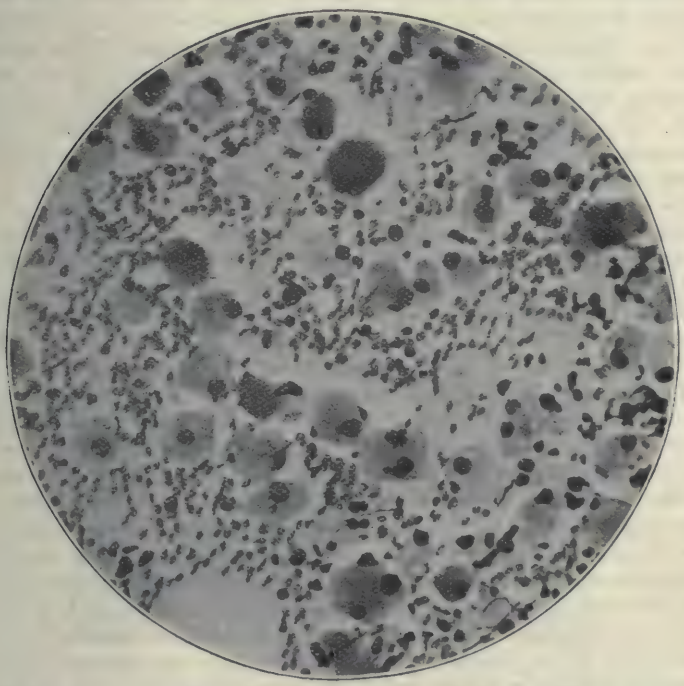


Fig. 93. Smear from fresh surface of spleen in Gaucher's disease. The size of the large cells as compared with the red-blood cells is readily appreciated. × 300.

sented which might substantiate any of these as causative factors. While it is true that a tropical form of splenomegaly exists, known as kala-azar, in which protozoa have been found, a thorough search for similar organisms has always failed in Gaucher's disease. In the present state of our knowledge the confession must be made that we know nothing definite of its pathogenesis. The organs involved are the spleen, liver, lymph-nodes, and bone-marrow, all of which show peculiar large cells and a variable amount of iron-containing pigment. The large cells are characteristic, and present the following features: they are usually round or oval, but when seen in large compressed

masses may assume a polygonal outline. The average measurement is from 20 μ to 40 μ in diameter, and a cell may contain from one to four or more nuclei of relatively small size. When smears are made from the freshly-cut organ (see *Fig.* 93), cells of huge size may frequently be found. The cytoplasm stains faintly with acid dyes and often presents a streaked and wrinkled appearance, but with high magnification a granular character may be noted. Some of the cells show vacuoles. Degenerative forms are not present except in cases of long duration ; but in the liver the cells may be so fused that their individual outlines are not recognized easily. The nuclei are small, round, deeply-staining, or, occasionally, somewhat larger irregular bodies. Rarely, they show atypical mitotic changes. The cells are quite unlike any found in other pathological processes ; one might compare them with atypical, swollen, and desquamated endothelial cells. The noteworthy feature of the liver, microscopically, is the enormous amount of interlobular connective tissue, which gives the usual picture of a fibrosis when examined with the low power. A more critical examination, however, shows a great number of cells identical in type with those found in the spleen, situated in the meshes of the connective tissue. The colour of the bone-marrow is always red, and small white or yellowish areas may be present. The consistency, as a rule, is soft. The typical large cells are found either singly or in groups, and no characteristic variation in the degree of involvement between early and advanced cases is apparent.

The question arises whether there is any real difference between this malady and Banti's disease (*p.* 139), in which great enlargement of the spleen with some degree of anæmia and leucopenia may be present for many years until the patient ultimately develops cirrhotic changes in the liver and dies. Brill and Mandelbaum consider that there is an essential difference between the two, and they lay great stress upon the presence of the large cells in the spleen, bone-marrow, liver, and lymphatic glands as differentiating the two. The point is an important one, because splenic anæmia of the Banti's disease type is cured by splenectomy, and the question arises as to whether Gaucher's disease ought not to be similarly treated. Brill and Mandelbaum record a number of cases in which **Splenectomy** was resorted to in Gaucher's disease, but the results were not very satisfactory, and the mortality was relatively high ; they argue that as the lesions in Gaucher's disease are by no means confined to the spleen, the large-celled proliferation being widespread through many parts of the body, splenectomy is not likely to be curative, whilst on the other hand, patients who receive no treatment at all live a great many years without any material discomfort. Erdmann and Moorhead,[2] on the other hand, hold the opposite view, and consider that splenectomy should be resorted to as early as possible, and quote some cases in which benefit has resulted. Both papers contain abundant references to the literature on the subject of this disease.

A valuable paper has been contributed by Owen Richards[3] upon

the results of splenectomy in connection with a peculiar malady of Egypt, generally known as *Egyptian splenomegaly*, the precise nature of which is not yet known. The main features are enormous enlargement of the spleen, moderate enlargement of the liver, slowly progressive asthenia, and ultimate death, generally preceded by ascites. **Splenectomy** cures a considerable proportion of the cases ; the woman illustrated below was well and active nearly two years after operation (*Fig.* 94). Broadly speaking, the cases most suited for operation appear to be those in which the spleen and liver are both already very large, in which the disease is already severe, and shows no evidence

Fig. 94.—Splenectomy for Egyptian splenomegaly. This woman made a good recovery, and was shown well and active at the end of nearly two years.
(*Illustration kindly lent by "British Journal of Surgery."*)

of any tendency to improve as the result of medical treatment by quinine, arsenic, or salvarsan, but in which the stage of ascites has not yet been reached. The disease to some extent resembles Banti's, but it differs from the latter in that it is associated with fever, is probably due to an infection as yet unknown, and the hepatic cirrhosis, instead of being a terminal stage of splenic anæmia as in Banti's disease, is an essential part of Egyptian splenomegaly from its commencement. Slight cases may recover ; more severe cases end in death from hepatic cirrhosis, ascites, and emaciation, the end seldom being delayed longer than six months after the development

of ascites. The mortality of the operation of splenectomy up to the present has been about 10 per cent; very likely in a subsequent series of selected cases it will be much less than this. Cases which survive the operation are much benefited, and some are apparently quite cured. The chief operative risk is hæmorrhage. Surgeons will find in Richards's article valuable information as to the technique of splenectomy, an operation practised increasingly for various conditions. Shock is usually slight if no blood has been lost, and recovery is rapid. The after-treatment does not differ from that of other abdominal operations. It is an advantage to keep the patient propped up.

The spleens removed ranged in weight from 2780 grams (over 6 lb.) to 535 grams (a little over 1 lb.), with an average weight of 1350 grams (3 lb.). The normal weight of the spleen is 170 grams, and consequently the largest spleen was sixteen times the normal weight, the smallest more than three times, and the average eight times. These weights were taken immediately after removal. The spleens removed were nearly all full of blood under pressure, and when the vessels were opened after removal, they discharged blood up to some 40 per cent of the total weight in the course of a few minutes.

Much work is now being done in connection with the *fragility of the red corpuscles* in cases of various blood diseases, especially when these are associated with enlargement of the spleen. Broadly speaking, this fragility is tested by determining how dilute a saline solution needs to be to effect the laking of the corpuscles in a particular case; the weaker the necessary salt solution, the greater the resisting power of the red cells. It appears that in certain cases with enlargement of the spleen anæmia results in spite of the resistance of the red corpuscles being normal or above the normal. In others, the resistance of the red corpuscles is much below the normal. It might be supposed that in the latter group the spleen becomes enlarged from the necessity of dealing with the products of red cells which were breaking down much more rapidly than they should, owing to their diminished power of resistance, and it has been argued that theoretically it is not a good thing to excise the spleen in cases in which this happens, although in other cases, in which the spleen appears to be destroying normally-resisting red corpuscles, splenectomy may be indicated. That this argument is erroneous seems to be indicated by some work to which Türk[4] refers, and he brings forward the view that the spleen is, sometimes at least, itself responsible for the diminished resisting power of the red cells. Thus, when toluylendiamin is injected into ordinary animals the red corpuscles are rendered much less resisting than they should be; but if in these animals the spleen has been excised previously, the toluylendiamin does not diminish the resisting powers of the red corpuscles in the same way; Türk suggests that if toluylendiamin acts thus, so also may other toxins known and unknown, their effect upon the blood corpuscles being the result of an indirect action through the spleen. Gilbert, Chabrol, and Bénard[5] find that in patients of the type of splenic anæmia or Banti's disease in whom

splenectomy has been performed, the operation is sometimes, but by no means invariably, followed by an increased resisting power in the red corpuscles, when previous to the splenectomy this was very much below par.

In malaria and leukæmia splenectomy is strongly contra-indicated. In Banti's disease (q.v.) splenectomy is likely to be followed by great improvement in health even when the third stage has been reached, whilst not a few cases become completely cured by the operation. Severe cases of anæmia splenica infantum may be cured by splenectomy ; in hæmolytic jaundice not a few patients are benefited by the operation. In pernicious anæmia (q.v.) improvement follows splenectomy in a moderate proportion of cases ; but so far the effects have not proved permanent.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1913, ii, 863 ; [2]*Ibid.* 1914, i, 213 ; [3]*Brit. Jour. Surg.* 1914, Jan. 419 ; [4]*Deut. med. Woch.* 1914, 371 ; [5]*Presse Méd.* 1914, 21.

Sir Leonard Rogers, M.D., F.R.CP.

Castellani[1] describes protozoal-like bodies he found in Ceylon in a case of prolonged fever with enlarged spleen in a boy, age 14. The temperature was intermittent and not affected by full doses of quinine. There was anæmia with a normal leucocyte count, except that the proportion of polynuclears was only 40. The disease progressed, and he became much emaciated and died. Post mortem all the organs were normal except the spleen, which was greatly enlarged, smooth, and red on section. The bodies were very rare in the blood, 7 microns in diameter, rounded or pear-shaped and vacuolated, staining blue with Giemsa, with several large masses of chromatin. In the spleen similar forms are rarely found, but the great majority differ in being roundish, oval, or crescentic, and only 2½ to 6 microns in the maximum diameter, with blue protoplasm, and generally one largish rounded mass of chromatin at one pole or in the middle, but occasionally with two such masses. The parasites are usually free, but may be found in leucocytes. He thinks they most closely resemble toxoplasma, and suggests the name *Toxoplasma pyogenes*. A coloured plate illustrates the bodies described.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1914, 113.

SPOROTRICHOSIS. *Herbert French, M.D., F.R.C.P.*

Roger, Sartory, and Ménard[1] describe a new variety of human mycosis of the genus *Chalara*, and give the name 'chalarosis' to the malady. They describe the characters of this mycotic fungus and the clinical conditions to which it may give rise. These are similar to those of other sporotrichotic infections ; as a rule there is some primary focus of absorption, such as the tonsil ; very gradually, and without any definite date at which the patient can say he began to be ill, general ill-health develops, and subcutaneous gumma-like nodules appear consecutively in different parts of the body ; these may subside without breaking, or they may become red and inflamed, break and discharge

purulent fluid, or form subacute cutaneous ulcers. The condition might be mistaken readily either for recurrent boils or carbuncles on the one hand, or for tertiary syphilitic lesions of the skin on the other. The diagnosis depends upon detecting the chalara fungus bacteriologically. The authors used experimental methods upon rabbits to verify the causal nature of the fungus, and similar lesions were produced to those which had occurred in the human being.

Some interesting cases of genito-urinary sporotrichosis are reported from New Zealand by Champtaloup.[2] In each instance the original diagnosis was renal tuberculosis. The correct diagnosis was arrived at, first, by finding that repeated examinations of the centrifugalized deposit from the collected urine are persistently negative as regards the finding of tubercle bacilli ; and, secondly, by the discovery in films made from the centrifugalized deposit of peculiar Gram-positive spores which were present in all Champtaloup's cases in catheter specimens of urine. Cultivations were obtained from these spores, and they conformed with the appearances produced by *Sporotrichum Gougeroti*.

Laurent[3] records several cases of sporotrichosis which came under observation in the region of the Loire during the short period of a year and a half, in all of which the clinical symptoms were such as to suggest tuberculosis either of the lungs or of some bone. It seems not at all improbable that if careful cultural investigations were made in all cases, not a few that are recorded at present as tuberculous might be found to be really due to sporotrichosis, for evidence is accumulating to show that the latter is by no means so uncommon as may hitherto have been supposed.

References.—[1]*Presse Méd.* 1914, 141 ; [2]*Austral. Med. Gaz.* 1914, 497 ; [3]*Presse Méd.* 1913, 793.

SPRUE.

(*Vol.* 1913, *p.* 461)—**Chromosantonin** (santonin yellowed throughout by exposure to the sun) in doses of 5 gr. t.d.s. is recommended strongly by Begg and Maxwell.

SPUTUM EXAMINATIONS. *O. C. Gruner, M.D.*

Albumin Content.—This has received attention at the hands of a few investigators during the past year. A paper by Holm and Himmelberger[1] advises the use of potassium ferrocyanide (5 per cent) as the reagent for albumin. The procedure is : Treat 10 c.c. sputum with 30 c.c. of 1 per cent acetic acid, shake thoroughly, and filter off 10 c.c. into a graduated centrifuge tube. Add 5 c.c. of the reagent, and centrifuge for five minutes. The albumin is recorded in volumes per cent. Each 0·1 c.c. in the tube means 4 per cent by volume in the original specimen.

The consensus of opinion about the significance of albumin is to the effect that a negative reaction means certain absence of tuberculosis. Melikjanz[2] found that it was present in cases of croupous pneumonia, varying in degree according to the stage of the disease. The later the albumin appears, and the later it is lost from the sputum, the worse is the prognosis.

Search for Tubercle Bacilli.—In the course of the routine work of the Division of Laboratories of the New York State Department of Health, it was found desirable to ascertain which is the most rapid among reliable methods of sputum examination. The work was carried out by W. S. Davis.[3] He arrived at the conclusion that the antiformin method was not the best because the results were influenced by the method by which the test solution was prepared. In other words, the amount of available chlorine was not constant in every sample. Consequently, he recommends the following inexpensive process in place of it. The sputum is treated with an equal volume of saturated aqueous solution of common salt, thoroughly shaken, and allowed to stand for six hours. The surface is then skimmed with a platinum loop, and a smear made. This is stained for twelve hours in cold carbo-fuchsin, followed by a slight rinse in tap-water and fifteen seconds' decolorization in acid alcohol. The counter-staining is as usual. The orthodox hot method of staining may be followed if desired. This elaborate study gives figures which show the process to possess an accuracy of 99 per cent, a testimony not available for the other methods in vogue, and there is the additional advantage that a centrifuge is not necessary.

In connection with the study of tubercle bacilli, a number of contributions have appeared dealing with the question of *sporoids.* Cohn[4] discusses such points as proportion of sputum corpuscles containing bacilli to those which do not, presence of beading, presence of sporoids, presence of lymphocytes. Kirchenstein[5] has dealt mainly with the morphology of the bacillus, and has discussed the technical significance of the granular bodies described by Sprengel,[6] Much,[7] and others. He decides that the Sprengel and Much granules are the same, viz., a resting or sporoid stage. The abundance or not of such forms may be an indication of the character of the infection. He describes forms which are germinating sporoids, growing sporoids, and ordinary bacilli. The proportions may be recorded graphically. The greater the number of sporoids, the more favourable the case. The more constant their number, the higher the degree of immunity of the patient.

Method of Staining for Sporoids.—The smear must be thick. After staining with warm carbol-fuchsin, an equal volume of Esbach's solution and absolute alcohol is poured on. In twenty seconds decolorize with 15 per cent nitric acid, and wash in 60 per cent alcohol. The slide is counter-stained with a mixture of picric acid and alcohol for another twenty seconds. Rinse dry. The preparation may show red or black granules, and granules partly red and partly black. The latter are sporoids, are round, sharply defined, and sometimes refractile in the centre.

Thermoprecipitin Reaction.—Faginoli[8] has devised the following: Sputum is well shaken in a flask with 2 c.c. chloroform, and incubated for three to four hours at 37° C. The chloroform is now decanted, then replaced with saline, filtered, and the filtrate poured upon Vallée's

tubercle-serum, as for a ring test. A ring will appear within half an hour at incubator temperature, if the material was tuberculous.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 20; [2]*Wien. klin. Woch.* 1914, No. 20; [3]*Med. Rec.* 1913, ii, 1120; [4]*Beitr. z. klin. d. Tuberk.* 1914, xxxi, 1; [5]*Ibid.* 33; [6]*Zeits. f. exper. Pathol.* 1909, Bd. vi; [7]*Handb. d. Tuberk.* 1914, Bd. 1; [8]*Münch. med. Woch.* 1913, 1480.

STATUS LYMPHATICUS. *Frederick Langmead, M.D., F.R.C.P.*

An ever increasing amount of attention is being directed to this mysterious condition, but it cannot be said that we are any nearer the truth as to its cause, or the manner in which it is associated with sudden death. The original view that death is produced by pressure of the enlarged thymus on vital structures has been abandoned by most authorities in favour of Paltauf's conception that the enlargement of the thymus is only one factor in a morbid constitutional state in which death from sudden heart-failure is easily induced by stimuli from the central nervous system. Other theorists suppose a condition of toxæmia, whilst Hart holds that this problematical toxæmia arises in the hyperplastic thymus gland. Besides that of the thymus, it is now recognized that hypertrophy of other lymphatic structures is also present, especially of the tonsils, the lymphatic areas at the base of the tongue and in the pharynx, the spleen, and the lymphatic patches of the large and small intestines. The lymphatic glands are often considerably enlarged, particularly those of the mesentery. Narrowing of the aorta, degenerative changes in the myocardium, and diminution of the chromaffin content of the adrenal glands are also described. Although fat, pale, and pasty children, in whom large tonsils or lymphatic glands can be seen or felt, are said to be likely subjects of this affection, diagnosis is impossible until the one definite symptom, sudden death, has supervened. Much has been said of the detection of the enlarged thymus by percussion or *x* rays, but few have been led by these means to a diagnosis which has been proved to have been correct.

C. McNeil[1] has recorded two groups of cases which bear upon this subject, the first comprising 13 cases of infants found dead in bed, the second cases of boys aged from ten to sixteen years, who died in most instances after less than a day's illness, and in whom the pathological appearances showed a curious resemblance to those of the first group.

The ages of the 13 infants who died suddenly ranged from twenty-five days to four months; all had been in a state of good development and robust health. In four cases the thymus was weighed: in three it was 20 grams, and in the fourth 51 grams; it was noted as enlarged in the majority of the other cases. Only in a minority of the series was hypertrophy of the lymphoid tissues of the alimentary tract noted. The lungs were examined microscopically in 8 cases, and showed evidences of commencing bronchitis and bronchopneumonia. This agrees with Paltauf, who, in 127 cases of sudden death in young children, found capillary bronchitis in every one. For this reason Paltauf excluded such cases from his series of examples

of status lymphaticus, but McNeil points out that it is reasonable to suppose that the degree of this condition present may have been a contributing cause of the sudden death.

The second group of cases was studied in connection with an outbreak of institutional pneumonia at an industrial school near Edinburgh. This assumed three clinical types: fulminant in the acutely fatal type; irregular and apparently lobular in a non-fatal group; and latent or abortive in another large group. Examination of the acutely fatal cases after death showed the classical signs of status lymphaticus. These observations led McNeil and McGowan to infer that the cases of fulminant pneumonia owed their rapidly fatal character to this morbid state, and that the irregular features of the non-fatal cases were due to the same condition, presumably in a less marked form.

The thyroid was examined in 5 of the cases of institutional pneumonia, and showed hyperplasia in every specimen. In the group of infants found dead in bed, thyroid hyperplasia was detected microscopically in 12 out of 13. The type of hyperplasia indicated that it preceded the bronchopneumonia, and supported the view that an abnormal constitution pre-existed.

McNeil also brings forward some evidence to show that fulminant types of other bacterial infections, such as scarlet fever and diphtheria, are also accompanied by status lymphaticus. On the other hand, it must not be forgotten that there are some who hold that the amount of lymphatic tissue which has been found in most of the recorded cases of status lymphaticus in children is not in excess of the normal —which at present is undetermined.

REFERENCE.—[1]*Edin. Med. Jour.* 1914 i, 25.

STERILITY IN THE MALE. *J. W. Thomson Walker, M.B., F.R.C.S.*

Dellinger Barney[1] draws attention to the rarity with which the husband is examined in a childless marriage. Of 105 cases diagnosed as sterility in women, the husband was first examined in only five (4·76 per cent). The author has examined the husband in 40 childless marriages, and found 20 actually sterile. The wives in four of these had undergone operation before examination of the husband was suggested.

The cause of sterility in the male is chiefly disease; congenital conditions such as bilateral undescended testicles, epispadias, certain types of hypospadias, and ectopia vesicæ, account for a certain number of cases. Of non-venereal diseases causing sterility in the male, mumps is the most common. In this disease orchitis, generally bilateral, is followed by atrophy of the testes and destruction of the spermatogenetic function in the majority of cases. Gumma of the testicle is uncommon and usually unilateral. When bilateral, recovery takes place under treatment, with restoration of fertility. Tuberculosis, even when unilateral, results in azoospermia in about 85 per cent of cases. This is due to the early involvement of the vas deferens, prostate, and seminal vesicles.

Alcoholic excess is a potent factor in the production of sterility. Simmonds estimates that 61 per cent of alcoholics are sterile. The author believes that absolute and protracted continence may cause azoospermia. "It also seems to be a fact that the otherwise healthy testes of normal, active, and sexually vigorous men may occasionally be entirely unproductive of spermatozoa." Repeated and prolonged exposure to the *x* rays is an important cause of sterility. Brown and Osgood found that (1) Spermatozoa were highly resistant to the *x* rays; (2) The spermatogenetic cells of the tubules of the testis show degenerative changes; (3) There is no deterioration of sexual activity. In a very small percentage of cases fertility may return after removal of the offending cause.

Injection by the gonococcus is by far the most frequent cause of male sterility. Prostatitis and seminal vesiculitis occur in the majority of cases and may result in sterility. If the ejaculatory ducts are occluded, azoospermia or oligospermia results. Prostatitis may also cause asthenospermia, the semen containing a few weakly motile and abnormally shaped spermatozoa; or the spermatozoa may be motionless, curled and abnormal in shape and size (necrospermia). These changes are the result of some unknown alteration in the reaction or composition of the prostatic or vesicular secretion. Epididymitis is another venereal complication causing sterility. When it is bilateral, sterility occurs in 75 to 80 per cent of cases. This is due usually to occlusion at the lower end of the epididymis. The operation of anastomosing an uninvolved portion of the epididymis and the vas deferens has been successful in "a large number of cases." Azoospermia may also occur in unilateral epididymitis, and is here due to prostatitis and seminal vesiculitis. Stricture of the urethra may cause sterility. In four cases of male sterility, the author observed a peculiar intermittency in the presence of spermatozoa. No spermatozoa might be found on two or three occasions, and numerous spermatozoa on the next.

REFERENCE.—[1]*Boston Med. and Surg. Jour.* 1914, i, 943.

STOMACH, CANCER OF. (*See* GASTRIC CONTENTS.)

STOMACH, DISEASES OF.

Radiography in diagnosis (*pp.* 55, 56).

STOMACH, SURGERY OF. *E. Wyllys Andrews, M.D.* (*Chicago*).

Gastric and Duodenal Ulcer.—Watson Cheyne[1] discusses the value of **Gastrostomy.** Referring to Mayo's series of cases, and the fact that many post-mortems show evidence of healed ulcer, he concludes that the mortality of gastric ulcer may not be over 0·034 per cent. He also draws attention to the natural tendency of ulcer to heal in all parts of the body and the skin. Our present methods of treating ulcer, whether medical or surgical, do not meet all the indications. Gastro-enterostomy does not place the stomach at rest. Are we, then, at the end of our surgical resources? The writer thinks it

might be worth while to perform gastrostomy to give the stomach more complete rest than can be done in any other way, and reports one case in which this had actually given excellent results.

Lecène,[2] reporting the cases of Hartmann and himself, discusses the relative frequency of gastric and duodenal ulcer. He recognizes the importance of the work by English and American surgeons, especially Moynihan and Mayo ; nevertheless, in France, he thinks it is established that ulcer of the duodenum is much less frequent than ulcer of the stomach. Lecène asks, Can one with certainty make a preliminary diagnosis of ulcer of the duodenum ? Moynihan thinks so, and goes so far as to say that the diagnosis of duodenal ulcer can be made by correspondence, placing it on late pain and painful sensation of hunger, relieved by taking food.

Mayo[3] reports cases of chronic ulcer of the stomach and duodenum in three periods. The first period was 1893 to 1900. The first operation in 1893 was a pyloroplasty, the second a gastrojejunostomy by the Murphy button. From this time on, a great number of such operations were performed, only cases showing marked obstruction being chosen. In the second period—from 1900 to 1906—growth of knowledge from surgical observation improved our diagnostic and operative measures. The uncertainty gradually disappeared, and patients were explored for symptomatic indications. Suture methods replaced all others, and gastrojejunostomy became the principal measure employed. In the third period, from 1906 to 1914, there was marked improvement in diagnosis. The great value of the history and the chemical findings was insisted on. The Röntgen-ray diagnosis gradually won its place. At the present time, up to the end of 1913, 1841 cases of acute and chronic ulcer of the duodenum had been operated upon. Of this number, 437 were females and 1384 males. In 636 cases the ulcers were located in the stomach, and in 1205 in the duodenum. The terminal $\frac{3}{4}$ in. of the pyloric end of the stomach was not often involved in the ulcer ; the most common seat of gastric ulcer being the lesser curvature. Multiple ulcers were frequent. The character of ulcers of the duodenum differs from those of the stomach. Usually they are in the upper two inches, and more often in the anterior wall. When on the posterior wall they resemble those of the stomach. Partial perforation of the duodenal ulcer, with circumscribed peritonitis, was observed several times.

The indications for operation were chiefly obstruction or inveterate hyperacidity resisting medical treatment. The operative measure employed was usually gastrojejunostomy, but in some cases the ulcer-bearing area was resected entire. This was true of all types of ulcer. In a small percentage of the cases, both gastric and duodenal ulcer, recurrence occurred, and occasionally peptic ulcer of the jejunum followed the operation.

Von Eiselsberg[4] gives the following as the principal indications for operation on gastric and duodenal ulcer : (1) Symptoms of perfora-

tion ; (2) Other complications, such as hæmorrhage, which we fear so much ; (3) Typical stenosis of the pylorus, especially in long-standing ulcer. In these conditions, unilateral pyloric exclusion, first performed by the writer in 1904, has been very successful. In ulcer at a distance from the pylorus, simple gastro-enterostomy is not so feasible as in ulcers of the pylorus itself, as shown by Clairmont. It offers only 34 per cent of success, as contrasted with 54 per cent in pyloric ulcers.

High hyperacidity, distinctly favouring the development of post-operative ulcer, detracts from the value of gastro-enterostomy and exclusion. Post-operative peptic ulcer may occur occasionally in the loop of bowel below the anastomosis. In case of ulcer far away from the pylorus, with high hyperacidity, transverse resection seems to von Eiselsberg an operation of choice.

Corner[5] advises a simple measure in perforating gastric or duodenal ulcer, which he has practised in several emergencies. The operation must be carried out quickly, according to plan (1) or (2).

1. Open the abdomen below the umbilicus. Examine the appendix and the pelvic viscera. Place a gauze packing in each loin and in the pelvis, and leave them there. Free gas may or may not be seen, but odourless greenish-yellow fluid always is.

2. Open the abdomen above the umbilicus, e.g., through the inner part of the right rectus. Find the perforation, mop out any extravasation above and below the liver or round the spleen. Place one end of a gauze 'plug' in the perforation to 'cork' it. Pack a layer or two of gauze plug over the ulcer, and wind the rest round a rubber tube which leads out of the wound.

Paterson has somewhat novel views on the question of hyperacidity and vicious circle following gastro-enterostomy. He takes the ground that the regurgitation of bile and pancreatic fluid through the false opening of the stomach may not be an injury but a direct benefit to the patient, as the alkaline fluid tends to neutralize the excessive acidity. He therefore advises return to the older method of anterior operation, and reports a large series of better average results than those following the posterior non-loop or Moynihan method of gastro-enterostomy.

Lynn Thomas[6] advises the direct intragastric treatment of certain ulcers of the stomach. Having found, in operating, difficulty in resecting certain ulcers, and in performing gastro-enterostomy, he carried out the following technique : (1) Scraping radially from the centre of the ulcer with a sharp spoon, he removed all the detachable unhealthy tissues as far as the mucous membrane. (2) With the thermo-cautery he then exposed the fresh base of the ulcer, in order to stop hæmorrhage and to sterilize. (3) Immobilization of the mucous membrane all around the edge of the ulcer was accomplished with a long blunt-pointed scissors like that of Charles Mayo. (4) Removal by morcellation with the Lane bone-nibbling forceps enabled him to destroy all the unhealthy mucous membrane found forming

the mobile edge of the ulcer. (5) The edges of the healthy mucous membrane are brought together by suitable stitches. (6) The gastrotomy wound was closed by separate suture. Operation performed in this way has given very successful results in Thomas's series of cases.

Galpern,[7] of the surgical clinic at Twer, Russia, discusses the end-results of pyloric exclusion done after the methods of Eiselsberg or Doyen. Thirteen cases are reported, all with *x*-ray examination after the operation, and with eleven complete recoveries. It would seem that by the method employed, complete and permanent exclusion of the pylorus can be obtained.

Hartmann,[8] of the University of Paris, asks what becomes of the gastrojejunal opening, and how does it work in cases of permeable pylorus? Does the gastro-intestinal opening obliterate in the case of patulous pylorus? He does not believe that, if carefully performed, the operation is followed by a closure. In 45 cases of anatomical obliteration of the gastro-intestinal mouth, gathered from the literature, he found only 4 cases of permeable pylorus. In 7 the cause of the obliteration was the secondary development and cicatrizing of a peptic ulcer at the gastrojejunal mouth. In 34 other cases the cause of the obliteration was less clear. He concludes that the obliteration of the false opening is in no way connected with the permeability of the pylorus, but results from the cicatrization of the peptic ulcer at the false opening. If properly performed, this does not occur, and is exceptional in cases of operation with the Y method.

Huguier[9] describes the technique of posterior gastro-enterostomy as done with the Jaboulay button, a modification of Murphy's. The ordinary opening having been made in the transverse mesocolon, a portion of the posterior wall of the stomach is drawn out, one-half of the button being placed in the short loop of jejunum and the other in the stomach. The parts are brought together and fall into normal relation.

A collective report of 200 cases of perforative duodenal ulcer treated in Edinburgh between 1896 and 1912 was furnished by about fifteen Scotch surgeons. In this series, 12 were done between 1896 and 1902, 43 between 1903 and 1907, and 145 between 1908 and 1912. Most of these cases presented symptoms of indigestion before perforation, and many had premonitory signs. The post-operative complications included subphrenic abscess in 5 cases, parotitis in 3, and hematemesis in 4. Duodenal fistula developed 3 times. The results of the last series showed 94 recoveries and 51 deaths. The propriety of adding a gastro-enterostomy to the other operative measures in perforative ulcer is not, in the authors' opinion, settled by these statistics.

Pannett[10] discusses the treatment of *duodenal fistula*, with a case of successful operation. Considerable difficulty has been experienced in closing these fistulæ, there being little tendency to spontaneous healing. The method advised by Berg of adding a gastrojejunostomy is a step forward in the successful operative treatment.

Wade[11] reports a case of *intussusception of the stomach and duodenum* due to a gastric polypus. *Plate LIII* shows the pathology better than any written description. Included in this article is an excellent *résumé* of the subject of benign tumours of the stomach.

Hertz[12] advises certain improvements in gastro-enterostomy to avoid the unfavourable after-effects. Among these is too rapid drainage of the stomach, which may induce diarrhœa. Patients with this symptom, examined with the *x* rays, show the stomach

EXPLANATION OF PLATE LIII.

Fig. A.—Showing lower limit of intussusception within the commencement of the jejunum.

Fig. B.—After partial reduction, showing puckered invagination of stomach and intussusception within duodenum.

EXPLANATION OF PLATES LIV AND LV.

Fig. A.—Normal stomach, as depicted in old anatomical text-books. *(Gray.)*

Fig. B.—Normal stomach, as revealed by radiography—*A*, bell of air always present at fundus; *B*, peristaltic waves; *C*, 'cap,' or commencement of duodenum. *(After Groedel.)*

Fig. C.—Normal stomach, with greater curvature reaching just below the umbilicus. *B* and *C* as in *Fig. B.* *(J. R. Riddell.)*

Fig. D.—Hypotonic stomach, fairly normal, but peristalsis slight, and greater curvature reaching about 2 inches below umbilicus; contractile power of stomach wall sufficient to keep the contents in a perpendicular column: lettering as in *Fig. B.* *(J. R. Riddell.)*

Fig. E.—Series of radiograms, illustrating the gastric systole and diastole. Beginning at the top and reading down left and up right side, the stomach shape is seen through a complete cycle, beginning and ending in diastole. *(Lewis Gregory Cole.)*

Fig. F.—"Prognathian, or under-shot dilatation of the stomach showing marked peristaltic efforts from pyloric obstruction." *(J. R. Riddell.)*

Fig. G.—"Atonic dilatation of stomach from pyloric obstruction." *(J. R. Riddell.)*

Fig. H.—Extreme atonic dilatation of the stomach from pyloric obstruction. The radiogram was taken thirty hours after the opaque meal, and shows the greater curvature of the stomach in the pelvis. The upper surface of the meal forms a horizontal line; the pylorus, *C*, is close to the umbilicus. *(J. R. Riddell.)*

Fig. I.—Atonic stomach, showing bell of air at the fundus, *A*, and duodenal 'cap,' *C*. Absence of peristaltic waves. The stomach has not enough contractile power in its parietes to keep the meal in an upright column, so that the walls above the meal fall together. *(J. R. Riddell.)*

Fig. K.—Atonic dilated stomach, with greater curvature in the pelvis. There is absence of any peristalsis. At the upper part some of the opaque meal is seen just entering the stomach. The radiogram illustrates the appearances after the 'double' meal of Haudek. The first is given six hours prior to the *x*-ray examination. It is seen to the left of the figure lying in the cæcum, ascending and transverse colon; some small masses are also seen high up on the right side at the splenic flexure. The second meal is given at the time of examination. From the position of the first meal the motility of the stomach is judged; then the second is given, when the manner of filing, peristalsis, shape, etc., are observed; and thus the entire examination is completed at one sitting. *(J. R. Riddell.)*

small and hypertonic, and too rapid evacuation of its contents into the bowel. Considerable improvement is obtained if the patient be instructed to lie down half an hour after each meal. Another cause of disappointment is the situation of the stomach above the upper level of the gastric contents. The *x* rays in these cases show no funnel-shaped depression ending in the stoma; therefore the bismuth accumulates in a pool below the false opening. Rest in bed also is very curative in this condition. Time tends to end these disturbances,

PLATE LIII.

GASTRO-DUODENAL INTUSSUSCEPTION

Fig A

Fig. B.

From "Surgery, Gynæcology, and Obstetrics"

PLATE LIV.

X RAY EXAMINATION OF THE STOMACH

(MAYLARD AND RIDDELL)

Fig. B.

Fig. C.

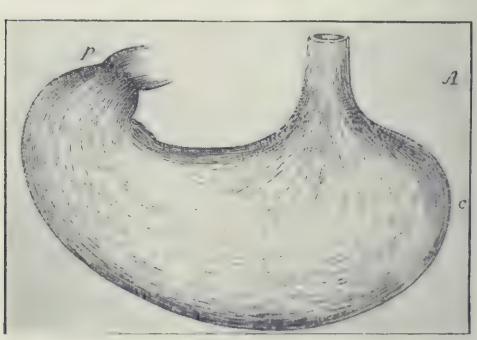


Fig. A.

Fig. D.

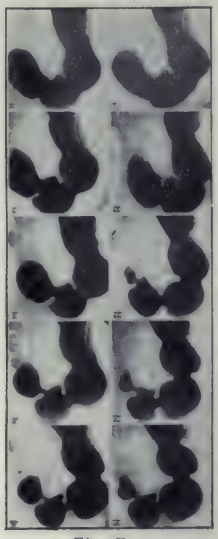


Fig. E.

PLATE LV.

EXAMINATION OF THE STOMACH—*continued*

(MAYLARD AND RIDDELL)

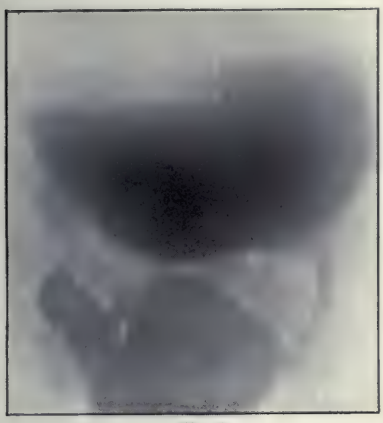


Fig. G.

Fig. H.

Fig. F.

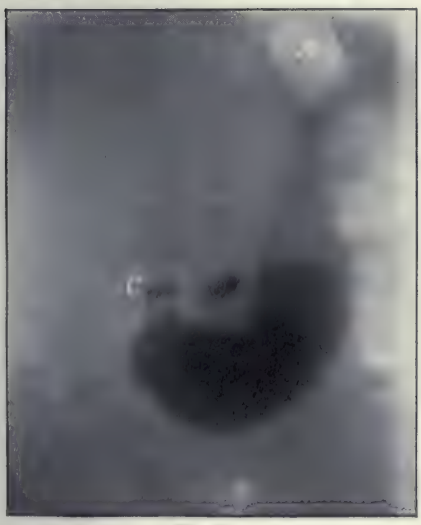


Fig. I.

Fig. K.

inasmuch as the stomach may contract and the false opening usually grows smaller.

The subject of *dilatation of the stomach* is discussed at length by Maylard and Riddell.[13] No better method can be imagined than repeated *x*-ray examinations, especially with the fluoroscope, and, if possible, with cinematographic pictures. The skiagrams accompanying this article are very instructive in this type of cases. (*Plates LIV, LV.*)

Moynihan and Tatlow,[14] as well as other observers, have noted a tendency to *peptic ulcer* at the gastrojejunal opening following gastroenterostomy. In one instance transgastric excision of the ulcer was made through an opening in the anterior wall. This incision is shown

Fig. 95.

in *Fig.* 95, and enabled the operator to get perfect access to diseased area, which was then resected, and a permanent cure obtained.

An elaborate paper by Finney,[15] describing his well-known operation of **Pyloroplasty,** reports 100 cases in his service. He uses this method in preference to gastrojejunostomy in every type requiring surgical interference. The end-results seem to compare very favourably with those more usually employed. The operation, as is known, is a somewhat more extensive plastic union of the duodenum and stomach than was obtained by the old Heinecke and Mikulicz pyloroplasty.

Lerche[16] has collected from the literature numerous cases of *spastic contraction of the pylorus* requiring surgical treatment. Gastrospasm

and pylorospasm are known to be relatively common in ulcer and erosion, and from various irritating lesions, including hyperacidity. The treatment would seem to be pyloroplasty by preference, as this is an anatomical preventive of trouble. Clinically, it is found that drainage operations, such as gastro-enterostomy, give almost equally good results.

REFERENCES.—[1]*Lancet*, 1914, ii, 294 ; [2]*Ann. Surg.* 1914, ii, 227 ; [3]*Ibid.* 220 ; [4]*Lancet*, 1914, ii, 296 ; [5]*Ibid.* i, 101 ; [6]*Brit. Med. Jour.* 1914, i, 1228 ; [7]*Münch. med. Woch.* 1914, 1447 ; [8]*Ann. Surg.* 1914, i, 832 ; [9]*Presse Méd.* 1913, 837 ; [10]*Lancet*, 1914, i, 1109 ; [11]*Surg. Gyn. and Obst.* 1913, ii, 184 ; [12]*Ann. Surg.* 1913, ii, 466 ; [13]*Glasgow Med. Jour.* 1913, ii, 334 ; [14]*Lancet*, 1914, i, 739 ; [15]*Surg. Gyn. and Obst.* 1914, i, 273 ; [16]*Ibid.* 1914, i, 358.

SULPHÆMOGLOBINÆMIA. *Herbert French, M.D., F.R.C.P.*

Sulphæmoglobinæmia has for its chief symptom marked cyanosis without abnormal signs in the chest to suggest disease of the heart or lungs. The patient shows a lead-blue colour of the lips, tongue, and nails, but no evidence of dyspnœa. The blood-count is usually normal, and it has been found that the cyanosis is due to an alteration in the chemical constituents of the normal blood pigment, hæmoglobin, a pathological pigment—sulphæmoglobin—taking the place of part of the oxyhæmoglobin and changing the colour of the blood from a bright red to a chocolate brown. The diagnosis of the disease depends upon spectroscopic examination of the patient's blood and the recognition of the characteristic absorption bands of sulphæmoglobin.

The pathology of the disease has hitherto been little understood, the most generally accepted view being that in some way poisonous quantities of sulphuretted hydrogen produced in the intestines lead to the production of the sulphæmoglobin, whence the name 'enterogenous cyanosis' sometimes employed. Mackenzie Wallis,[1] however, has recently carried out some extensive researches which, if confirmed, will serve to throw much fresh light upon the nature of the disease, for he has found that in all the five cases he has been able to investigate, the saliva has contained peculiar micro-organisms, which during the process of their growth upon proteid media lead to the formation of nitrites ; and he brings forward evidence to show that sulphæmoglobinæmia is the result of infection by this, which he calls the *Nitroso-bacillus*. His original paper should be consulted for details as to its cultural characters. Besides nitrites it leads to the formation of a reducing substance in the media upon which it grows, and also in the blood of patients infected by it ; and the author's view is that the sulphæmoglobinæmia is due to the action of the nitrites, and this reducing substance upon the traces of sulphuretted hydrogen normally present in the body, and the interaction between hæmoglobin and the reduced sulphuretted hydrogen. Another interesting point that he brings out is that the saliva of patients suffering from sulphæmoglobinæmia contains quantities of nitrites that are easily demonstrable to ordinary tests ; for instance, the Greiss-Ilosvay reagent for nitrites produced an intense red coloration with the saliva of his sulphæmoglobinæmic patients and not with that of other persons.

If Mackenzie Wallis's views are confirmed, it would appear that one of the essential points in the treatment of sulphæmoglobinæmia should be attention to the mouth and the adoption of steps devised for preventing the further growth of nitroso-bacilli in it.

REFERENCE.—[1]*Quart. Jour. Med.* 1913, Oct., 73.

SYPHILIS. (*See also* SPINE, SYPHILIS OF.) *C. F. Marshall, M.D.*

PATHOLOGY.—Emery[1] regards the *Spirochæta pallida* as the cause of syphilis, because, since its recent cultivation, it fulfils all of Koch's postulates. But he does not believe in any of the complicated life-cycles which have been described. In support of this he urges the facts that the organism exists as a spirochæte in all stages of syphilis, from the chancre to the last stage of tabes and general paralysis, and that it can be cultivated for many generations, during which, except for occasional spherical bodies which are probably involution forms, it remains a spirochæte.

Emery regards the outbreak of symptoms, both primary and secondary, as a phenomenon of hypersensitiveness, or anaphylaxis. Noguchi's lu tin reaction shows that a healthy person is immune to the syphilitic toxin, while in a syphilitic person a papular or pustular lesion develops. Hence, he concludes that the tissues only react to the syphilitic toxin when they become hypersensitive or anaphylactic, and the syphilitic granuloma or chancre is the result. General infection, which occurs after the spirochætes have become disseminated in the blood-stream, is due to the loss of the natural bactericidal properties of the blood, perhaps especially of the complement, which occurs as the result of the combination of the antibodies in the blood with the spirochætes. This general infection, or spirochætal septicæmia, only occurs in the early stages of the disease. At this period spirochætes reach all parts of the body, where they remain latent, to develop later on when some cause, such as traumatism, or some change in the immunity or nutrition of the tissues, awakens them to renewed activity. During the secondary stage of syphilis the blood and tissues become profoundly altered in their metabolism. This results in the formation of the Wassermann substance in the blood, antibodies, an increase in globulin, changes in the red corpuscles and leucocytes, increase in the amino-nitrogen in the blood, and increase in the amount of extractives in proportion to urea. The power of resistance to other diseases is also diminished. Tertiary syphilis is explained by assuming that the blood regains its spirillicidal power, while the tissues remain sensitive. This is shown by the luetin test, which is generally positive. In other words, tertiary syphilis, according to Emery, is a gradual return to the normal.

As regards the Wassermann reaction, we must assume that it is due to the presence of some substance which is not present in normal blood, and which is not an antibody. It is probably set free by destruction of cells. The results obtained by using a pure antigen in the form of a pure culture of the *S. pallida* do not correspond to

those obtained by the ordinary antigens. According to Noguchi, the reaction obtained by the pure culture indicates a defensive reaction, while the ordinary Wassermann reaction is a measure of the extent of the syphilitic process. Emery holds the view that the Wassermann reaction shows the presence of active disease, and is proportional in intensity to the extent of the lesions. He explains cases of negative reaction in tertiary and congenital syphilis with active symptoms by destruction of the Wassermann substance by an unknown mechanism after it has been in the blood for a long time. Such cases usually give a positive luetin reaction.

Coming to the action of drugs, he considers that mercury and salvarsan have a direct bactericidal action on the spirochætes, and also an indirect action by the production of antibodies stimulated by killed spirochætes, i.e., an action similar to that of vaccines. Iodides, on the other hand, he says have little or no spirillicidal action, and act rather like antitoxins. Concerning the curability of syphilis, Emery thinks the disease can be aborted by excision of the chancre in its early stages ; also, that it is curable in the late primary and early secondary stages. In the late secondary and in the tertiary stages the complete cure becomes gradually more difficult, but frequently occurs. Some cases remain resistant to treatment and are possibly incurable. This may be due to changes in the spirochætes, which become resistant to salvarsan or mercury, and perhaps also to the syphilitic antibodies. Similar changes have been demonstrated in the case of other organisms, both protozoal and bacterial. This suggests the advisability of changing from one drug to another before tolerance to one is acquired.

As regards parasyphilis, Emery holds that the syphilitic process can be arrested or cured either by mercury or by salvarsan, although the damage done by destruction of portions of the nervous system cannot be repaired. Concerning the recent method of intrathecal injection of salvarsanized serum, Emery thinks the action is due to the presence of minute traces of salvarsan and not to the presence of antibodies in the serum, as was supposed by Swift and Ellis. He has used this method in one case of general paralysis and two of tabes with apparent benefit. In one case the reflex to light, which had been absent for some years, is said to have returned. The only certain proof of cure is the occurrence of re-infection ; but, for practical purposes, Emery considers that a patient may be assumed to be cured if his Wassermann reaction, which had previously been positive, remains negative for a year after the cessation of treatment.

Nichols[2] expresses the following views of the pathology of syphilis : (1) The spirochætes become localized during the early secondary period, and probably not in the later stages ; (2) All different strains of the spirochæte probably become localized indifferently in certain organs, but certain strains probably have a special affinity for certain organs ; (3) Various strains of the *S. pallida* exist which differ in pathogenic properties, and these strains are probably permanent

variations ; a strain isolated from the nervous system has been shown to have the power of generalization in the rabbit ; (4) Early localization in the testicle has been demonstrated experimentally ; (5) An active lesion in one part of the body tends to inhibit the development of potential lesions in other parts of the body. In secondary syphilis with invasion of the nervous system, as long as the skin lesions are active, nervous symptoms rarely occur ; but if the skin lesions are healed, the inhibiting effect of these is lost and nervous symptoms appear. Conversely, in general paralysis other lesions of syphilis are rarely seen, owing to the inhibiting effect of the nervous lesions on spirochætes localized elsewhere.

Graves[3] reports positive results from the inoculation of rabbits with blood from cases of general paralysis. After an incubation period of sixty-six days the rabbit showed spirochætes in the testicle inoculated, and also in skin lesions about the eyelids, perineum, and anus. Syphilitic lesions of the testicle were produced in another rabbit by inoculation from the first, and lesions containing spirochætes developed on the prepuce. From this rabbit the disease was transmitted to two female rabbits by mating, one with and one without previous scarification of the vaginal orifice. In the same rabbit gummas were found in the testicle after ninety days. The spirochætes from the lesions in each of the infected animals appeared identical with *S. pallida*, both by dark-ground illumination and by Giemsa's staining.

Diagnosis.—McDonagh's[4] views on the *Wassermann reaction* are briefly as follows. The antigen owes its activity to the amino group which it contains. The antibody is a lipoid-globulin, and the greater the quantity of lipoid the more positive is the reaction. The fact that syphilitic serum gives a positive, and normal serum a negative, reaction, is due to the difference in size and number of the lipoid-globulin colloidal particles. Complement is the normal lipoid-globulin of the serum in an ionic state, and originates from the lymphocytes. Complement is the same substance as antibody. It is the protective substance of the serum, and becomes antibody when its colloidal particles increase in size and number to combat the infection. Inactivation of complement alters its ionic state and rids it of oxydases, which are probably responsible for its action.

The Wassermann reaction is a purely physical reaction, and is not specific. In ordinary circumstances syphilitic serum has the physical properties necessary to produce the reaction, but normal serum may be made to possess them. Hence, any modification of the reaction, such as the addition of cholesterin to the antigen, only increases the tendency of normal serum to give a positive reaction. The reaction is an adsorption phenomenon. This requires molecules which are electrically charged and which have oxydases attached to them, and, as all antibodies arise from and constitute complement, the latter is necessary for all these reactions, since it is the only perfectly charged molecule in the serum, and is the molecule to which the oxydase is attached. In adsorption the lipoid-proteid molecules (complement

and antibody) coalesce and are precipitated. This de-ionizes complement and destroys its oxydases, so that there is no electrically charged lipoid-protein molecule to bring about hæmolysis. When an antibody meets its homologous molecule in the antigen, adsorption of the two molecules takes place. This results in precipitation and hydrolysis, by which the complement properties of the antibody are destroyed. Hæmolysis is explained in the same way. The molecular structure of the lipoid-globulin in the amboceptor is the same as that of the red corpuscles of the sheep. If complement is present, or if the amboceptor (serum of rabbit immunized against sheep's corpuscles) still possesses its complement action as well, adsorption between the red corpuscles and the amboceptor takes place. This adsorption alters the osmotic pressure, so that hæmoglobin escapes from the corpuscles. When the adsorptive power of a serum has been increased, as occurs in syphilis, it is liable to show the same phenomenon under certain conditions, most of which occur after the serum has been withdrawn. Moreover, a positive reaction may be due to several factors—increase in size of the protein molecule, preponderance of lipoid in the lipoid-globulin, breaking down of the lipoid-globulin molecule into smaller ones, and an excess of fatty or amino acids. These various factors cannot be prevented or differentiated. Hence a positive Wassermann reaction does not necessarily indicate active syphilis, and a negative reaction does not exclude syphilis or indicate a cure. Again, a positive reaction does not mean the presence of spirochætes in the body, because there is no ratio between the positivity of the reaction and the number of spirochætes present ; for example, tertiary cases in which few spirochætes are present. As the complement is the most important factor in the reaction, any modification of technique which depends upon the patient's own complement is fallacious. The complementary action varies greatly in different serums, so that a standard strength of complement is necessary. Hence, the original Wassermann technique is the only reliable one. However, a positive reaction only means that the patient has presumably had syphilis.

Landau[5] has devised a new method for the serum diagnosis of syphilis, by means of *iodine*. He points out that the complement-fixation reaction is physico-chemical, and is based on the colloidal precipitation of syphilitic serum by lipoids contained in organic extracts. He has attempted to render this physico-chemical change visible by means of iodine. The reagent used is a 1 per cent solution of iodine in tetrachloride of methane, which must be freshly prepared for each series of tests. Of this solution 0·1 c.c. is added to 0·2 c.c. of serum in a test-tube, and left for four hours at room temperature. Syphilitic serum is said to give a clear yellow colour, while normal serum gives a greyish opaque colour. The serum must be fresh. This reaction is said to give a larger number of positives than the Wassermann, especially in primary chancre. The reaction was positive in all cases of tertiary syphilis. All controls were negative.

Foster[6] reports his experience with the *luetin reaction*. The per-

centages of positive reactions in treated cases of secondary, tertiary, and latent syphilis were 77, 80, and 88 respectively. Of five apparently normal control cases, one developed a typical papular reaction. This case had no signs of syphilis and the Wassermann reaction was negative, but the maternal grandmother suffered from paralysis suggestive of tabes. Foster mentions that it has been shown that the state of allergy, or anaphylaxis, upon which the luetion reaction depends, may be transmitted from a sensitized guinea-pig to her offspring, and that this transmission can occur only through the female. He therefore thinks it possible that the positive reaction in this case may be explained by a state of allergy transmitted from a syphilitic grandmother. Primary and secondary untreated syphilis were not included in Foster's cases, but the work of others seems to show that the reaction rarely occurs in the early stages of syphilis. Comparing the relative value of the Wassermann and luetin reactions, he remarks that a positive Wassermann test indicates the presence of metabolic substances in the serum due to the presence or recent activity of spirochætes, while a positive luetin reaction indicates a state of hypersensitiveness to the specific proteins of the spirochæte, induced by a period of cessation in the introduction of these proteids before the injection of luetin. He concludes that the test is valuable in the diagnosis of tertiary and latent syphilis, but of greatest use in prognosis.

Noguchi[7] summarizes the results of about 50 investigators to estimate the practical value of the luetin reaction. In primary syphilis the reaction is present in less than 30 per cent of cases, and its intensity is mild. In secondary syphilis it is present in 47 per cent, and is also mild. In tertiary syphilis the reaction occurs in about 80 per cent, and is intense and usually pustular. In congenital syphilis the reaction occurs in about 70 per cent of cases, and becomes more distinct after energetic treatment. In syphilis of the nervous system the reaction occurs less frequently in acute syphilitic meningitis than in parenchymatous syphilis, such as tabes and general paralysis, where it is positive in about 60 per cent. In visceral syphilis the reaction is present in about 90 per cent of cases, and is especially distinct in aortic insufficiency. As regards the relation of the luetin reaction to the Wassermann reaction, all observers agree that the two do not run parallel in the same cases; the luetin reaction may be absent when the Wassermann is strongly positive, and conversely. Both reactions, however, frequently occur in the same patient, especially in congenital syphilis and general paralysis. This discrepancy is explained by Noguchi by the fact that the luetin reaction indicates allergy, and the Wassermann the presence of an active syphilitic process. A patient in whom the Wassermann reaction has become negative after energetic treatment will respond more readily to the luetin reaction than before treatment. The luetin reaction appears to be more delicate in detecting latent or tertiary syphilis than either a provocative test or a Wassermann in which the antigen is fortified by the addition of cholesterin. The Wassermann reaction is more constant in primary

and secondary syphilis and in general paralysis, and the luetin reaction more constant in chronic cases, especially those under treatment. The luetin reaction is important as regards prognosis. Noguchi thinks it probable that cases of general paralysis with a positive luetin reaction are amenable to antisyphilitic treatment, since the reaction is indicative of a mesenchymatous tertiary process.

Pusey and Stillians[8] use one part of luetin with two parts of salt solution. They point out that the reaction should not be interpreted before forty-eight hours. A transient reaction which subsides in two or three days is not pathognomonic. Control reactions disappear in five to seven days, but a true luetin reaction persists beyond the seventh day. The reaction was negative in 7 cases of primary syphilis, positive in 21 out of 104 cases of secondary syphilis, and positive in 68 out of 122 cases of tertiary syphilis, 18 of which had a negative Wassermann. Controls from various diseases were all negative.

Baeslack[9] describes a method for the *sero-enzyme diagnosis* of syphilis. This is based on the idea that the formation of proteolytic enzymes in the blood is stimulated by the introduction of proteins into the organism, the proteins being then split up into simpler components. The discovery of chorionic epithelium in the blood during pregnancy led Abderhalden to apply this method to the diagnosis of pregnancy, using placental tissue for the reaction. It was afterwards applied to the diagnosis of neoplasms and tuberculosis. (*See* MEDICAL ANNUAL, 1914, 150). Baeslack has made experiments to see if syphilitic serum contains enzymes which act on the *Spirochæta pallida* or the cell degenerations caused by its presence. The serum normally contains dialysable substances which will give the reaction when no tissue is added; hence only such reactions which give a dark violet colour are to be considered positive. A positive reaction shows that the serum contains substances which have rendered the added protein dialysable; that is, that the serum contains proteolytic ferments. The formation of these proteolytic ferments, which are considered specific, presupposes the presence of split protein in the serum. Thus, a positive reaction shows (1) the entrance of foreign substances into the blood, (2) the formation of a specific proteolytic ferment in the serum. The reaction disappears in case of clinical cure, or if the entrance of foreign proteins into the blood ceases; and it is assumed that the organism has lost the power to reproduce the specific ferments when the disease is still active. The tissues used in these experiments were the lesions produced in rabbits' testicles by inoculation with human syphilis. These lesions contain numerous spirochætes and the products of cell degeneration. For the technique of the method the reader is referred to the original articles. Baeslack's conclusions are as follows: (1) The sero-enzyme test for syphilis, when carried out with syphilitic testicle, is probably a specific reaction, since the somatic cells are highly specialized, presupposing a specific enzyme for their cleavage. The tissue from rabbit's testicle is free from the contaminations of human syphilitic material. (2) The reaction does not apply to the cerebrospinal fluid.

(3) It is more specific than the Wassermann reaction, for it always gave a positive reaction with the serum of tabetics, and was positive in eight cases in which the Wassermann was negative.

Treatment.—Bunch[10] remarks that, since it is generally recognized that salvarsan, however powerful in relieving the symptoms of syphilis, is only capable of curing the disease in the earliest stages, if at all, we are forced to return to mercury. "It is mercury which is our real stand-by in the cure of syphilis, as distinguished from the improvement, or clearing up, of syphilitic symptoms." He therefore reviews the chief Continental methods of **Mercurial Treatment.**

Inunction can be carried out at home, and skilled rubbers can be obtained in London. If the usual unguentum cinereum causes dermatitis, it can be replaced by a vasenol preparation containing 33·3 per cent of mercury. This is a cleaner preparation, and also cheap.

For intramuscular injection the soluble cyanide or biniodide may be used, in a 1 per cent solution, of which 20 minims is the dose. These may also be used for intravenous injection when a rapid effect is required, as in cerebral syphilis.

For insoluble intramuscular injections the chief preparations are salicylate of mercury, grey oil, and calomel. Calomel and mercury salicylate can be given in vasenol or liquid paraffin; grey oil according to Lambkin's formula or that of the French Pharmacopœia. Grey oil is best injected with Barthélemy's syringe, divided either into fourteen divisions of which each corresponds to 1 cgram of pure mercury when the 40 per cent grey oil is used, or into fifteen divisions, each corresponding to $\frac{1}{6}$ gr. of mercury. Calomel and mercury salicylate are more powerful and rapid in action than grey oil. The advantage of insoluble injections is that they need only be given once a week; the disadvantage is the uncertainty of absorption.

Fumigation is still recommended by some. It is performed by volatilizing from 30 to 60 gr. of calomel or cinnabar over a spirit lamp in a closed chamber from which the patient's head projects, or by seating him naked on a stool, covering him up to the neck with a rug, and heating the calomel under the stool. Taylor prefers a mixture of one part calomel with two parts cinnabar.

Mercurial baths of perchloride or biniodide are more suitable for cases of congenital syphilis. It is doubtful how much mercury enters the skin, either by the water or vapour bath, and most of the effect is probably due to entry by the respiratory passages. Mercury may be given in this way by means of a wire mask with a gauze lining impregnated with mercury. It is worn during the night.

Zigler[11] urges more intensive mercurial treatment in syphilis. He points out that the efficacy of mercury has been forgotten in the exaggerated enthusiasm for salvarsan. He does not believe that the symptomatic effects of salvarsan are more pronounced than those of mercury and iodides in combination. "The real problem in syphilis is parasyphilis. Arsenic itself has a special affinity for nervous tissue

and produces degenerative processes in nerves, and no man can say now whether these massive doses of arsenic given as salvarsan are going to diminish or increase them" (Pusey). Zigler recommends intramuscular injections of salicylate of mercury in doses of 1 to 2 gr., and gives details of several remarkable results obtained by this method.

Kingsbury and Becket[12] recommend intravenous injections of mercury. The advantages of this method are immediate introduction of the drug into the circulation, rapid therapeutic results, correct dosage, and absence of pain. The preparations used were the perchloride, $\frac{1}{6}$ to $\frac{1}{3}$ gr., and the benzoate in doses of 2 to 12 c.c. of a 1 per cent solution. The best results were obtained with the perchloride, an average of six injections being given in each case. Cases of chronic palmar syphilides, serpiginous ulceration, and gumma healed after a few injections.

A new preparation of mercury, **Merlusan,** has been introduced by Matzenauer.[13] This is said to be a combination of mercury with tyrosin, in which the former is in a colloidal state. Tyrosin, a constituent of all albumins, is said to be the only amino-acid which forms a mercury-albumin compound suitable for therapeutic purposes. Merlusan may be given by the mouth or by intravenous or intramuscular injection. Internal administration is said to produce an effect as powerful as mercurial injection or inunction, and to cause no gastro-intestinal troubles. Merlusan is also recommended for an injection in gonorrhœa.

Gibbard and Harrison[14] endeavour to prove the superiority of combined treatment by **Salvarsan and Mercury** over exclusive mercurial treatment. In support of this contention they mention that out of 378 patients treated exclusively with mercury, 83 per cent relapsed during the first year, while out of 152 patients treated with two injections of salvarsan and four of mercurial cream, only 3·9 per cent relapsed within a year of suspension of treatment. Their latest scheme is as follows: an intravenous injection of salvarsan, then five weekly injections of mercurial cream, then a second injection of salvarsan, then five more injections of mercurial cream, finally a third injection of salvarsan the dose of the latter being 0·6 gram on each occasion. Out of nearly 4000 injections in soldiers of the British Army, there was only one fatality, and no lesions of the eye or cranial nerves which were not amenable to further treatment.

G. B. Scott[15] reports his results at the Royal Naval Hospital, Chatham. In primary syphilis he gives two or three intravenous injections of 0·6 gram salvarsan or 0·6 to 0·75 gram neosalvarsan combined with three months' intensive mercurial treatment, by means of inunction, injection, by the mouth, or combined. The mercury was pushed to salivation. He considers that mercurial injections are insufficient at the onset of the disease, and prefers inunction. In secondary syphilis he regards repeated injections of salvarsan or neosalvarsan as dangerous, a large number of fatal results having

occurred in apparently strong and healthy subjects in whom no contra-indications were found. He mentions a fatal case in which arsenic was found in the brain by Bassett-Smith. He adduces evidence to show that a fatal issue may sometimes be avoided by the removal of a considerable quantity of blood. He finds no evidence in favour of fatalities being due to damage to the kidneys with consequent uræmia. He mentions cases in which the first injection of salvarsan apparently stimulated the spirochætes, instead of killing them. This explains the so-called neuro-recurrences. To avoid the danger of accumulation of the drug, mercurial treatment for a month before the second injection of salvarsan is advised. The method of treatment advised by Scott is as follows: (1) In primary syphilis with a positive reaction, and in secondary syphilis of less than a year's standing, one injection of salvarsan with another a month later, and possibly a third, and mercury for a year after the reaction has become negative. In this stage the injections of salvarsan at weekly intervals are dangerous. (2) In syphilis of over a year's duration with no active symptoms, salvarsan is unnecessary; if there are active symptoms, it may be given at intervals of a month. Mercury is the chief means of preventing relapses, and should probably be continued at intervals for life. He states that weekly injections of salvarsan, besides being dangerous, may produce a strain of spirochætes resistant to arsenic. When salvarsan cannot be given, arsenic by the mouth often gives good results. Among the secondary effects of salvarsan in Scott's cases were two cases of epileptiform convulsions, one fatal case of convulsions, one case of facial paralysis, and one of complete bilateral deafness.

Wolbarst[16] considers that **Intramuscular Injection of Salvarsan** is superior to intravenous, owing to the more continuous action and slower elimination of the drug. The only objection is the pain. He reports seven cases of syphilis which were apparently cured by one injection. These cases comprised two of chancre, three of secondary syphilis, and two of tertiary. The dose of salvarsan was 0·5 gram, intramuscularly. No other treatment was given. The periods since injection averaged two years and six months. There have been no recurrences, and in four of the cases the Wassermann reaction has remained negative. The author considers this sufficient evidence of the 'cure' of syphilis. (*See also p.* 2).

McDonagh's[17] method of treatment is as follows: In the primary stage, five injections of **Neosalvarsan,** and mercurial injections for a year; in secondary syphilis, nine injections of neosalvarsan, and mercury for two years; in tertiary syphilis, sufficient treatment to cure the symptoms; in congenital syphilis, mercury only. According to this observer, salvarsan, even when combined with mercury, has little effect on late congenital syphilis. Early cases of arterial disease, such as hemiplegia and transverse myelitis, should be given the same treatment as for secondary syphilis. Syphilitic meningitis is best treated with two intrathecal injections of **Salvarsanized Serum,** and

afterwards the same treatment as for secondary syphilis. In tabes with severe symptoms, intrathecal injections of salvarsanized serum may be given ; the risk of aggravating the disease is reduced by giving several injections. McDonagh prefers neosalvarsan to salvarsan, because it is less toxic, and may be safely given every four days to ambulatory patients. He states that the present salvarsan is weaker in action than the original arsenobenzol.

He holds the view that *S. pallida* is the male form of a life-cycle which results in the formation of spores, and that the adult sexual bodies are the cause of the symptoms, while the spores are the cause of the disease. In his opinion, although treatment may do much to prevent the micro-organism completing its life cycle, the resistance of the body does more ; for all protozoal diseases in which the symptoms depend upon the completion of a life cycle by the infecting micro-organism have a tendency to spontaneous cure, because the longer the parasite is within the host, the less able is it to complete its life cycle, and the less influence has treatment upon it. He considers that salvarsan is able to kill the spores in the earliest stage of the disease, but not in the later stages. He concludes that many cases of syphilis can be cured by combined arsenical and mercurial treatment in the early stages of the disease, but not all, and that no cure has yet been discovered for cases of latent syphilis.

Howard Fox[18] reports good results with **Neosalvarsan** in 56 cases of syphilis, 45 of which were treated by intravenous and 11 by intramuscular injection. Intravenous injections were given every other day, to the number of two, three, or four. Intramuscular injections were given in iodipin oil, to the number of one or two. The doses are not mentioned. The author concludes that neosalvarsan is slightly less active in effect than salvarsan, but has the advantage of greater ease in preparation and injection. (*See also p.* 20.)

Gaucher[19] writes on the *dangers and insufficiency of salvarsan*. He points out that in cases of death after salvarsan, autopsies have revealed congestive or hæmorrhagic encephalitis, often accompanied by symptoms of uræmia, and congestion of the liver and kidney similar to those in animals poisoned by the same drug. He mentions the 274 fatal cases collected by Mentberger, and thinks that the number of unpublished cases is even greater. He considers cranial nerve paralysis and polyneuritis of the limbs occurring after salvarsan as due to arsenical neuritis, not to syphilis. He has observed two cases of complete bilateral blindness caused by salvarsan. He mentions cases of fatal paraplegia, occurring after injections of neosalvarsan, which he attributes to arsenical myelitis. He states that salvarsan has a remote as well as an immediate toxic effect on the nervous system, and mentions a case of general paralysis which developed in the third year of syphilis, in a patient treated at first by salvarsan. He does not believe that syphilis can be sterilized by salvarsan, and mentions cases of early chancres, published by Lévy-Bing, in which several intravenous injections of full doses failed to prevent secondary

syphilis. As regards the claim that salvarsan, by its rapid healing effect on superficial lesions, shortens the period of contagion, Gaucher holds that this is a fallacy, and that salvarsan prolongs the contagious period by its retarding and aggravating influence on secondary lesions. This retarding influence is seen in the numerous instances of redux chancre and recurrent roseola, which account for many of the cases of so-called reinfection. He mentions a case in which the roseola recurred four times, after seventeen injections of salvarsan. In conclusion, Gaucher repeats what he said in 1910; (1) Salvarsan is a dangerous and often fatal poison to the nervous system: (2) Salvarsan does not cure syphilis, but only acts on ulcerative lesions of the skin and mucous membranes, and this only temporarily.

Miskdjian[20] analyzes 167 cases of death after salvarsan. After eliminating 51 cases in which death was not due to the drug, 17 in which death was due to syphilis, 19 in which it was due to intercurrent diseases, and 15 in which the patients were *in extremis*, there remain 65 in which death was due directly or indirectly to the drug. In 19 of these, death was due to the action of salvarsan on an enfeebled constitution, but the remainder were due to its toxic action alone. The clinical symptoms of death from salvarsan intoxication differ from those of ordinary arsenical poisoning, owing to the molecular constitution of the drug. According to this author, salvarsan intoxication depends on a certain condition of the organism which cannot be foreseen. In general, two forms of intoxication are met with—the gastro-intestinal and the nervous. The gastro-intestinal form is characterized by dryness of the throat, epigastric pain, diarrhœa, slight icterus, and often anuria; death occurs from coma, usually in two or three days. The nervous form has been described as hæmorrhagic encephalitis, although the lesions do not always show this condition. The nervous form is related to the gastro-intestinal. It is met with most often in young and robust subjects. As a rule there is a latent period of apparent good health. This is followed by the sudden, progressive, or insidious onset of headache, vomiting, epileptic attacks, and coma. There is no paralysis; but stiffness of the neck, contractures of the limbs, trismus, Kernig's symptom, dyspnœa, and small and rapid pulse are observed. Death occurs generally in two or three days. The partisans of salvarsan have attempted to explain these fatalities by Herxheimer's reaction, by impurities in the distilled water employed, and by technical errors, but in reality they are due to a special form of arsenical intoxication. This has been proved by experiments on animals. The author concludes that salvarsan is an exceptional drug which should only be used when mercury fails.

Milian[21] considers that certain accidents caused by salvarsan are due to insufficiency of the suprarenal glands. He therefore recommends the injection of **Adrenalin** immediately before the injection of salvarsan. Schwarzman[22] also advises injection of adrenalin, but explains the accidents by the direct paretic action of salvarsan and neosalvarsan on the vasomotor nerves, causing dilatation of the great

vessels and stagnation of blood. It is thus especially dangerous to those whose arterial tension is already low, but it may cause paresis of the vasomotor centres in persons with normal tension. The vaso-constrictor action of adrenalin is said to counteract this tendency.

Kanngiesser[23] points out that a moderate dose of salvarsan, 0·4 gram, contains more than the maximum dose of arsenic. He ridicules the attempts of the partisans of salvarsan to explain its toxic effects by impurities in the water and glass, or by renal insufficiency. He concludes that salvarsan is a dangerous drug, the use of which should be prohibited.

Troisfontaines[24] gives his experience with **Galyl** and **Ludyl,** new arsenical preparations produced by Mouneyrat. The former contains 35·3 per cent, the latter 33 per cent of arsenic. Galyl and ludyl are, like salvarsan, yellow powders soluble in water with the addition of carbonate of soda. Except in tertiary cases, the patients had received no other form of antisyphilitic treatment. Injections were made at intervals of four or seven days. The dose for injection varied from 20 to 55 cgrams ; the total dose from 1 gram to 1 9 gram. According to this author, there is no need to regulate the dose according to the body weight, nor to give smaller doses to females. Most of the cases were treated with galyl, which the author considers to be of equal therapeutic activity to salvarsan, and free from the toxic effects of the latter. Galyl may be given by intravenous injection of an alkaline solution, or by intramuscular injection of an oily suspension. Mercurial treatment is recommended in addition, but the lesions disappeared as quickly without mercury as when associated with it. When mercury was given, this was in the form of grey oil, salicylate, or calomel injections, sometimes as soluble injections or inunctions. Galyl had a rapid effect on the chancre, mucous syphilides, and tertiary ulcers, less so on papular syphilides. The secondary effects were slight or absent. (*See also p.* 15.)

Johnston Abraham[25] also reports favourable results with galyl. He remarks that, although no such catastrophe as total blindness is likely to follow the use of salvarsan, yet this substance is not without danger, even in competent hands. According to Mouneyrat's experiments on animals, in acute salvarsan poisoning death is due to intense congestion, with hæmorrhagic foci in the brain, liver, kidneys, spleen, and lungs, and both salvarsan and neosalvarsan can produce hæmorrhagic meningo-encephalitis. Delayed salvarsan poisoning, according to this observer, is due to its neurotropic action, since a part of each injection becomes fixed by the nervous tissues. This toxicity, in Mouneyrat's opinion, is not due to the arsenic, but to the presence of functional groups in the molecule which act on the nerve nuclei in the same way as the basic dyes such as fuchsin, methylene blue, etc., which contain similar functional groups. Abraham points out the tendency of salvarsan to affect the eighth nerve, and mentions several cases of stone deafness which occurred after its use. Recognizing these dangers of salvarsan, he has tried galyl. The average doses

given are 0·45 to 0·55 gram for a male ; 0·4 to 0·5 gram for a female. For solution. 30 c.c. of distilled water per decigram is used, i.e., 150 c.c. for 0·5 gram. Three injections were given at intervals of a week. The clinical results were as rapid as with salvarsan, and there were no complications. The contra-indications for galyl are the same as for salvarsan—cardiac, renal, and probably nervous diseases. Abraham is of opinion that arsenical treatment, whether by salvarsan, neosalvarsan, or galyl, should be followed by a two years' course of mercury. He says, " It would appear that mercury is regaining once more its old position as the main stand-by in the treatment of syphilis, and that the real progress of arseno-therapy lies not in the direction of complete cure, but rather in its rapid healing effects on the early, highly contagious stages of the disease."

McWalter[26] advocates **Antimony** in the treatment of syphilis. He does not think that antimony alone will cure syphilis, but that it assists in the cure when associated with mercury. He recommends the red sulphide (antimonium sulphuratum) in doses of 1 to 2 gr. continued for two or three months. He considers it especially useful in broncho-pneumonia occurring in infants with congenital syphilis, and in certain nervous affections. The beneficial effects are attributed to the spirillicidal action of antimony. McWalter remarks that a reaction has set in against the " therapia magna sterilisans " of Ehrlich by large doses of salvarsan, and that Neisser advocates a combination of drugs in moderate doses, the combined effect of which is greater than when any one of them is used alone. Some spirochætes are affected more by mercury, some by arsenic, and others probably by antimony. Modern views seem to suggest that the treatment of syphilis must consist not only in killing the spirochætes, but in rendering the tissues resistant to their life cycle. The seed, the soil, and the life cycle have all to be modified, and it is absurd to suppose that any one drug can produce all these effects.

R. Connell[27] has tried the effect of **Ionic Medication** on syphilitic lesions, including chancres and syphilitic ulcerations. The best results were obtained in cases free from secondary infection. The following technique was employed : After cleansing the ulcer, several pieces of lint soaked in 2 per cent perchloride of mercury solution are applied, the first piece being cut to the size of the ulcer. The electrode consists of a narrow strip of zinc or copper sheeting connected with the positive pole. The author considers it unnecessary to use a mercury electrode. A current of 2 to 4 ma. is applied for five minutes, and repeated in three or four days. After the fourth day the ulcer rapidly heals. In broken-down gummata good results were obtained by using an iodide ion. (*See also p.* 72.)

Lévy-Bing[28] has investigated the effect of various methods of treatment upon the Wassermann reaction. These included treatment by salvarsan or neosalvarsan, by salvarsan and mercury followed by neosalvarsan, by mercury followed by neosalvarsan, by neosalvarsan and mercury combined, by mercury followed by combined mercury

and neosalvarsan, and by mercurial injections of calomel, grey oil, and benzoate of mercury. He reports the results of forty cases of primary and secondary syphilis, which were kept under observation for long periods, and comes to the following conclusions: (1) Mercury, in all its forms, has a slow effect on the reaction, but this gradually tends to become negative. (2) Neosalvarsan produces a negative reaction more rapidly than mercury, but this is never permanent. (3) The results are variable and depend on the intensity of treatment and the age of the disease. Early syphilis is more rapidly influenced than late. The influence on the reaction also depends on the patient: some resist more than others. Some, in which a negative reaction is obtained with difficulty, are examples of malignant or of severe syphilis, but in most cases the failure of medication on the reaction cannot be explained, and is observed in benign syphilis. (4) The forty observations do not confirm the idea that antisyphilitic treatment is capable of rendering the Wassermann reaction permanently negative. The reaction became negative several times during the course of prolonged and intense treatment, but it never remained negative very long. As a rule, the curve of the reaction is very irregular. (5) The results of the reaction do not give any guide to treatment. The Wassermann reaction is useful in diagnosis, provided it is associated with clinical investigation, but it is of little value as regards prognosis and treatment.

In these observations salvarsan and neosalvarsan were given intravenously, the doses of the former being 0·4 to 0·6, and of the latter 0·45 to 0·9 gram. The number of injections varied, the highest being 48 injections of neosalvarsan during two years and a quarter. Calomel was given in doses of 0·05 or 0·06 gram, grey oil in doses of 0·06 gram, and benzoate of mercury in doses of 0·02 gram. The serum test was made according to Wassermann's technique, excepting the antigen, for which Desmoulières' mixture of cholesterin with powdered liver treated with ether was used.

Embarin recommended (*p.* 13).

References.—[1]*Lancet*, 1914, i, 223; [2]*Jour. Amer. Med. Assoc.* 1914, i, 466; [3]*Ibid.* 1913, ii, 1504; [4]*Brit. Med. Jour.* 1914, ii, 624; [5]*Presse Méd.* 1914, 335; [6]*Amer. Jour. Med. Sci.* 1913, ii, 645; [7]*N.Y. Med. Jour.* 1914, i, 349; [8]*Jour. Cutan. Dis.* 1914, 560; [9]*Jour. Amer. Med. Assoc.* 1914, i, 1002, and ii, 559; [10]*Pract.* 1914 i, 255; [11]*N.Y. Med. Jour.* 1913, ii, 819; [12]*Jour. Amer. Med. Assoc.* 1914, i, 563; [13]*Wien. med. Woch.* 1913, Nos. 38, 39; [14]*Brit. Med. Jour.* 1913, ii, 1341, and 1914, ii, 617; [15]*Ibid.* 1913, ii, 1344; [16]*N.Y. Med. Jour.* 1913, ii, 747; [17]*Brit. Med. Jour.* 1914, ii, 616; [18]*Amer. Jour. Med. Sci* 1914, i, 97; [19]*Jour. des Prat.* 1914, Feb. 28, Mar. 7; [20]*Thèse de Paris*, 1913. [21]*Bull. Soc. de Derm.* 1914, No. 1; [22]*Ann. des Mal. Vén.* 1914, 503; [23]*Ibid.* 1914, 524; [24]*Presse Méd.* 1913, 887; [25]*Brit. Med. Jour.* 1914, i, 582; [26]*Ibid.* ii, 623; [27]*Ibid.* i, 138; [28]*Ann. des Mal. Vén.* 1914, June.

SYPHILIS, CEREBROSPINAL. (*See also* Cerebrospinal Fluid; General Paralysis.) *Purves Stewart, M.D., F.R.C.P.*

Pathology.—Since the discovery of the *Treponema pallidum* and the elaboration of the Wassermann reaction and of other chemical and histological tests of the blood and cerebrospinal fluid, the study

of cerebrospinal syphilis has received a great impetus. The frequency with which the nervous system is affected by syphilitic lesions is found to be much greater than was formerly suspected. Ravaut,[1] of Paris, so long ago as 1903, found that in secondary syphilis, with few or no symptoms pointing to nervous disease, save perhaps an occasional nocturnal headache, the cerebrospinal fluid in about 70 per cent of cases shows well-marked syphilitic changes. This has since been confirmed by numerous observers. Thus Wile and Stokes[2] of Michigan, examined a series of 36 cases of secondary syphilis. In 34 of these the Wassermann reaction in the blood was strongly positive, no record being preserved of the remaining 2. The cerebrospinal fluid was examined in all 36 cases, and in two-thirds of them positive evidences of syphilitic infection were found in the form of lymphocytosis, excess of globulin, or positive complement fixation, singly or combined. This is a high proportion when compared with the relatively low rates of involvement of older cases of syphilis. White,[3] for example, in a series of 1016 recent and old cases of syphilis, found only 8 cases of tabes and 1 of general paralysis. It is therefore probable that this early involvement of the central nervous system is in most cases a transient affair. The nervous system is specially likely to be involved in cases where the eruption is of a papular or follicular type. Syphilitic patients with headache, insomnia, and other subjective nervous phenomena, show positive findings in most cases.

In cases of definite and well-established syphilitic lesions within the central nervous system, it is evident that organic changes, whether in the blood-vessels, the meninges, or as a primary degeneration of the nervous elements, must precede the earliest clinical symptoms. There is, in fact, what Ravaut has aptly termed a 'pre-clinical' stage of cerebrospinal syphilis, which may last for months or even years before the first clinical sign makes its appearance. It is during the pre-clinical stage, moreover, that treatment is likely to be most effective; hence the importance of recognizing the disease at this stage. Fortunately, we are able to do so by examination of the cerebrospinal fluid and blood. A negative Wassermann reaction in the blood is insufficient by itself to exclude cerebrospinal syphilis, which may occasionally remain active and even progressive when the Wassermann blood reaction has become negative under antisyphilitic treatment. This is notably the case in the so-called nerve relapses (neuro-récidives) which we occasionally meet with, some six or eight weeks after full doses of salvarsan. It is also not uncommon to find tabetic and general paralytic patients in whom the Wassermann reaction is completely negative in the blood. It is therefore evident that we cannot rely on blood-examination alone, to decide whether a patient has or has not cerebrospinal syphilis.

Fortunately, however, the cerebrospinal fluid gives us indications of syphilitic infection of the central nervous system, either in the presence of a globulin reaction, the existence of pleocytosis, or the occur-

rence of a positive Wassermann reaction. Not only do these reactions demonstrate the presence of cerebrospinal syphilis; they also enable us to estimate the degree of its activity. As the disease subsides under treatment, the cerebrospinal fluid correspondingly improves, and when all three of the above-mentioned reactions have become negative, we may feel confident that syphilitic mischief is no longer actively present.

It is important to remember that changes in the cerebrospinal fluid precede the ordinary clinical signs and symptoms of nervous disease, and that they may be well marked when the clinical phenomena are slight or absent. So significant is this fact that the presence of such changes in the cerebrospinal fluid demands immediate and energetic antisyphilitic treatment, without waiting for the appearance of signs of gross focal disease.

Syphilitic lesions in the central nervous system may be of three varieties: (1) Gummatous masses, arising in non-nervous tissues and compressing or infiltrating the nervous tissues; (2) Syphilitic endarteritis, culminating in arterial thrombosis, with the production of an area of softening in the brain or spinal cord; (3) The parenchymatous nervous diseases, in which special nerve cells and nerve tracts undergo primary decay and degeneration, resulting from the direct action of the syphilitic toxin. Tabes and general paralysis are the most outstanding examples of parenchymatous nervous syphilis.

Prognosis.—These three varieties of syphilitic lesions differ widely in their respective prospects of cure. Gummatous lesions may often be removed by medicinal means, and recovery may be complete, unless a fibrous cicatrix is left behind, or unless secondary degeneration of the compressed nerve tracts has already occurred, in which case a certain amount of permanent damage persists, even after the gummatous lesion is gone. In the group of syphilitic arterial diseases, the lesion in the arterial wall may yield to treatment; but if thrombosis has already occurred, with an area of actual softening, the damage done to the nervous structures within the thrombosed area must necessarily remain. With regard to parenchymatous nervous diseases like tabes and general paralysis, the prognosis as to arrest or cure has hitherto been unfavourable, inasmuch as the most energetic antisyphilitic treatment administered by ordinary channels, by the mouth, hypodermically, or intravenously, has usually failed to influence the course of the malady to any material degree. Fortunately, however, in general paralysis, and still more frequently in tabes, there is sometimes a tendency to spontaneous remissions, so that the disease may come to a standstill, although it is always liable to be lighted up again to renewed activity.

Treatment.—How can we treat these various classes of cerebrospinal syphilitic disease? Gummatous deposits are to be attacked by means of **Mercury** and **Iodides** in full doses, together with intravenous administration of **Salvarsan** or **Neosalvarsan.** Certain precautions have to be borne in mind. Thus, it is risky in cerebrospinal

syphilis to give salvarsan in the full intravenous dose of 0·6 gram. It is safer to proceed with repeated doses of not more than 0·3 gram. In this way we not only diminish the chances of acute arsenical symptoms, but the series of smaller doses is less likely to be followed by the alarming group of intracranial syphilitic symptoms known as nerve relapses or 'neuro-récidives.' Further, patients with renal disease or with well-marked cardiovascular diseases are generally unsuitable for salvarsan medication, inasmuch as the very rapidity with which the drug removes syphilitic deposits may be a source of danger, e.g. in the neighbourhood of diseased arterial walls.

Gummata arising in the meninges or around the vessels of the brain or spinal cord often subside rapidly under antisyphilitic treatment, and if the parenchymatous nerve structures (nerve cells, nerve fibres, and neuroglia) have escaped degeneration, recovery may be complete. Syphilitic arterial lesions with their resulting areas of thrombosis and softening, whether in the spinal cord or brain, are relatively less hopeful, since, even though the syphilitic endarteritis may clear up completely under treatment, yet, if vascular obstruction has already occurred, the area of necrotic softening remains as a permanent affair. In parenchymatous syphilitic affections due to direct action of the syphilitic toxin upon the nerve cells, nerve fibres, and neuroglia, there is a curious selective action upon certain cells and tracts, so that in one patient the exogenous fibres of the posterior columns are picked out, producing tabes dorsalis; in another the lateral columns are selected as in Erb's syphilitic paraplegia; in a third there is primary optic atrophy; whilst in a fourth the frontal cortical cells and tangential fibres are picked out as in dementia paralytica. Moreover, these varieties of parenchymatous nervous syphilis may occur together in various combinations, as in the familiar tabo-paralysis.

Hitherto parenchymatous syphilitic nervous diseases have been singularly resistant to treatment. This is due to several reasons. Firstly, nerve cells or nerve fibres within the central nervous system, once they have degenerated, are incapable of regeneration, so that the most we can hope to achieve by treatment is to arrest the degeneration at the stage to which it has attained, and to make the most of those nerve cells and fibres which have not yet undergone degeneration. Another important factor which renders parenchymatous syphilitic degenerations difficult of treatment, is their peculiar anatomical situation with relation to the blood stream. In the central nervous system the circulation is peculiar, inasmuch as the capillary walls are separated from the parenchymatous nerve elements by a perivascular lymph space. Moreover, each nerve cell has its pericellular lymph space. These spaces are irrigated by the cerebrospinal fluid. Now this is secreted by the cells covering the choroid plexuses, cells which have a selective action, permitting some substances, e.g. urotropine, alcohol, etc., to pass from the blood stream into the cerebrospinal fluid, and being totally impervious to other substances, such as mercurial and arsenical salts, including salvarsan.

Thus, no matter how assiduously the general circulation be flooded with mercury or salvarsan, the cerebrospinal fluid does not transmit these drugs, nor allow them to reach the nerve elements. Parenchymatous nervous syphilis, therefore, treated by ordinary channels, continues to progress. In order to reach the organism within the nerve cells and fibres, remedies must enter the cerebrospinal fluid. The credit for directing attention to this important principle belongs firstly to Marinesco,[4] of Bukarest, in 1911, and to George Robertson,[5] of Edinburgh, who described the treatment of general paralysis in 1913 by means of **Salvarsanized Blood Serum** intrathecally administered; also to Swift and Ellis,[6] of New York, who, following Marinesco, applied the same treatment to cases of tabes dorsalis. Still more recently Ravaut[7] has proposed the administration of neosalvarsan by direct injection into the cerebrospinal fluid.

The ordinary technique is as follows: An hour after the intravenous injection of 0·3 gram salvarsan (or of 0·45 gram neosalvarsan), 60 c.mm. of blood are withdrawn by venepuncture into a sterile flask. This blood is allowed to clot. The separated blood serum is diluted with normal saline solution to form a 40 per cent mixture, and is kept at a temperature of 56° C. for an hour. Next day, 30 or 35 c.c. of this diluted serum are introduced intrathecally by gravity, through a long rubber tube, previously withdrawing a quantity of cerebrospinal fluid for control. This procedure is repeated at intervals of seven to fourteen days. After each intrathecal injection the patient is kept in the horizontal posture for several hours. In the case of general paralytics the foot of the bed is raised, so as to attain the Trendelenburg posture, and thus to favour the diffusion of the salvarsanized serum upwards to the cranial cavity. Campbell[8] allows the blood to clot, standing the sterile flask in a jar of 5 per cent carbolic lotion for twelve hours (by which time the serum has separated sufficiently), and injects this undiluted serum intrathecally. By Ravaut's technique, bleeding is unnecessary. A 6 per cent solution of neosalvarsan in distilled water (7·5 c.c. containing 0·45 gram of neosalvarsan) is made up at the patient's bedside. Of this 0·1 to 0·15 c.c. (one to three drops), i.e. 6 to 9 mgrams of neosalvarsan, are injected intrathecally by means of a specially fine syringe and needle, after withdrawing a quantity of cerebrospinal fluid for examination. The remainder of the solution (i.e. 0·45 gram of neosalvarsan *minus* the 6 to 9 mgrams previously used) is injected intravenously.

A considerable number of cases thus treated have now been recorded. Thus Purves Stewart[9] published a series of 25 cases of parenchymatous nervous syphilis, including 13 of tabes and 9 of general paralysis. Campbell[8] records 8 cases of tabes, Myerson[10] 8 cases of general paralysis, Spencer[11] 7 cases of tabes, Wile[12] 7 cases of tabes and 5 of general paralysis and tabo-paralysis, and so on. A good many of the cases recorded by Campbell appear to have had only one or two intrathecal injections, which cannot be considered a thorough treatment, for unless the cerebrospinal fluid becomes

reduced to an approximately normal condition, it is evident that the disease is still active. In tabes the clinical effects of treatment are often very striking; lightning pains and gastric crises usually subside, sphincter control often improves, and ataxia diminishes, whilst in some cases the knee-jerks even reappear, though this is exceptional.

The results of treatment in general paralysis are very interesting. The average duration of the disease, by the time it is first recognized clinically, is about three years. This, of course, does not include the pre-clinical stage, where profound changes can be demonstrated in the cerebrospinal fluid, if looked for. Some cases run their course in a few weeks or months, whilst a few last for many years. An important feature in the disease is the occasional occurrence of spontaneous remissions, during which the symptoms cease to advance, and the patient may even regain mental power for a time. These are probably cases where the brain cells have not been destroyed by the syphilitic spirochæte, but have only been poisoned. Sooner or later, however, the remission comes to an end and the disease resumes its fatal march.

In the treatment of general paralysis it is hopeless to try and restore nerve cells that are already destroyed. The most we can hope to achieve is to arrest the disease at the stage which it has already reached. If the changes are not yet destructive, but merely toxic, the chances of success are much brighter. Hence the importance of recognizing the malady in its earliest stages, preferably during the preclinical period.

Treatment of general paralysis by salvarsanized serum, in my own experience and in that of other observers above mentioned, almost always produces, if persevered with, striking improvement in the condition of the cerebrospinal fluid. This is frequently, but not invariably, accompanied by an improvement in the physical signs and mental symptoms, so that a previously insane patient may be able to return to his ordinary life and business. Whether such improvement amounts to a permanent cure remains to be seen. These patients require to be observed for years to come, not only with reference to their mental symptoms, but also as regards the condition of the cerebrospinal fluid, which will show signs of active syphilitic mischief long before the mental symptoms break out. Further, it is important to select for treatment those cases of general paralysis which are in the early or toxic stage of the disease, before the cortex has become profoundly degenerated. The earlier the disease is recognized, the better are the prospects of improvement. Many of the recorded cases have been in the advanced stage, with profound cortical degeneration and dementia. These are totally unsuitable for treatment, and should have been rejected at the outset. How much of the improvement obtained by the salvarsanized serum is due to the actual salvarsan introduced into the cerebrospinal fluid, is a very open question. Considering that only a small fraction of the blood in the body is removed an hour after salvarsan administration, it is

obvious that the salvarsanized serum can only contain a very small amount of salvarsan. The occasional striking results of treatment may therefore be due, not merely to the salvarsan, but to the antibodies in the blood which are evoked by its presence.

Mention should also be made of the *intracranial route of administration* of salvarsanized serum, which has been advocated by Campbell,[13] Ballance,[14] Förster,[15] and others, for the treatment of general paralysis, the serum being injected into the lateral ventricle through a puncture in the corpus callosum after trephining the skull just to one side of the falx cerebri. This route seems, on anatomical grounds, more likely to be efficient than by merely injecting the remedy on to the surface of the cerebral cortex, as has been done by Marinesco and Minea,[16] also by Sicard and Reilly.[17] Beriel,[18] of Lyons, most ingeniously reaches the sub-arachnoid space at the base of the brain by a needle passed into the orbit and through the outer part of the sphenoidal fissure. By this route a trephine opening is unnecessary, and the puncture can be repeated as often as is desired. With regard to intraventricular injections of serum, it has still to be shown that this method affords results better than, or even as good as, those yielded by the intraspinal route. It is an open question whether we are justified in subjecting a patient to a major cerebral operation, which will probably have to be repeated several times, unless definitely better results are shown to be obtained. So far, no case of general paralysis has been published in which intraventricular operation has produced clinical results in any way better than those yielded by the simpler intrathecal method. Moreover, by elevating the foot of the patient's bed for several hours after the intrathecal injection, the remedy can be made to diffuse upwards to the brain. Experimental corroboration of this fact has been made in dogs, in which, if colloidal carbon be injected into the spinal theca, and if the animal's head thereafter be kept dependent, the carbon particles can subsequently be found in the cerebral ventricles, and even in the cerebral cortex itself.

The credit of treating *tabetic ataxia* by means of **Re-education Exercises** belongs to Frenkel, who since 1897 has done much to popularize this form of treatment. The essential principle of Frenkel's exercises is that the patient who has become ataxic, mainly owing to deficient joint and muscle sense, often with superadded muscular hypotonia, is taught to guide his unsteady limbs by means of vision, carefully watching each movement with his eyes. This control of movements by vision is the indispensable factor in Frenkel's exercises. It has, however, long been familiar to neurologists that tabetic patients who have become blind from optic atrophy are often singularly free from ataxia. Therefore, the use of sight in controlling and preventing ataxia is not essential.

Maloney,[19] of New York, whilst admitting the beneficial results often achieved by Frenkel's method, boldly discards visual control by the patient, and teaches re-education movements from the begin-

ning with the patient blindfolded. He also emphasizes the importance of fear as a factor in producing and aggravating ataxia, whereas confidence and reassurance diminish it. Practically every tabetic walks better in private than in public ; he dreads open spaces, traffic, street-crossings, etc., and as he dreads, so his ataxia increases. Maloney founds his treatment upon these two basal considerations : the concentration of attention by blindfolding during the re-education exercises, and the elimination of fear.

First of all, he provides certain simple mechanical aids to minimize ataxia when walking. The boot is strengthened at the outer side of the ankle to prevent the foot turning in, the sole of the boot is broadened by a wide welt, and a steel plate is placed in the sole to prevent bending. The heel of the boot is low and wedge-shaped, with the base of the wedge on the ground, and this is continued along the outer side of the sole. The effect of these various measures is that the patient stands more securely, since he gets support from every part of this broadened surface simultaneously. This gives him more confidence from the start. To combat the occasional giving-way at the knee to which, owing to muscular hypotonia, many tabetics are liable, a light bandage of elastic webbing is applied to support the knees.

The principles of Maloney's exercises are as follows : The patient is blindfolded. He commences his treatment lying down. First he is taught relaxation exercises, being made to relax all the muscle groups of the face, neck, trunk, and limbs in succession, each order being carried out slowly and with suitable pauses. These blindfold relaxation exercises are of value, inasmuch as the co-ordination exercises which follow are begun on an unconstrained musculature, and are not superimposed on existing habit contractions. Next comes the stage of movements, blindfolded as before. Commencing with the ankle, passive flexion and extension are carried out by the physician, rhythmically and uniformly, making the patient meanwhile count aloud. Next, the patient lightly resists the passive movement. Then the same movements are performed with the patient performing and the physician aiding and guiding. Then the movement is executed by the patient alone, and finally the movement is made against resistance. During every movement the patient counts rhythmically. All exercises are done without shoes. After the ankle, the knee and hip of the same limb are educated. From the right lower limb we proceed to the left. Before walking is taught, the trunk muscles must first be co-ordinated by similar relaxation and movement. After these recumbent exercises, similar movements are practised in the sitting posture. Then the first attempt at progression is made. Padded knee-caps are tied on the knees. The patient is taught to creep, being careful to keep the back as horizontal as possible. Then the erect kneeling posture is learned, and, finally, walking is taught. Whenever in the course of these exercises the performance is unsatisfactory, the patient is made to relax for a few

minutes before trying again. Every movement must be performed without strain. Fatigue must be carefully avoided. Hence a lesson of one hour every other day is usually enough, the patient practising his old lesson in the intervals at home. Maloney claims that by the foregoing method he obtains greater and more rapid improvement than by the Frenkel method, where the patient learns to re-educate his limbs with the aid of vision.

As regards the treatment of fear, which Maloney holds to be another factor of great importance, the modified shoes and the light elastic bandaging have a tranquillizing effect, which is further encouraged by the blindfolding, the relaxation exercises, and the graduated movements. The alleviation of ataxia is itself a treatment of fear. Deep breathing is another important mode. Finally, the effect of suggestion by an enthusiastic physician is probably still more powerful in restoring the patient's confidence.

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SYPHILIS, INHERITED. *Frederick Langmead, M.D., F.R.C.P.*

The Wassermann reaction is being employed as a means of determining the incidence of syphilis among groups of cases where the ordinary signs of that disease are usually lacking Some of the results of these investigations with regard to mentally deficient children were considered in the MEDICAL ANNUAL, 1914.

J. Leslie Gordon[1] has tested the blood-sera of 400 patients in the asylums of the Metropolitan Asylums Board suffering from various forms of congenital mental deficiency ; 66, or 16·5 per cent, gave a positive result. Of 153 epileptic cases, 33, or 21·5 per cent, reacted positively. The percentage of positive reactions among the 247 who were non-epileptic was 13·3. The reaction was positive in 1 of 12 hydrocephalic patients, in 1 of 12 microcephalic, in 1 of 6 suffering from epiloia, and in both of 2 general paralytics ; but it was negative in all of 8 Mongols, and in the only cretin examined. In 267 cases of 'simple' mental deficiency without paralysis, the reaction was positive in 11·9 per cent ; but when it was associated with various forms of paralysis, it was obtained in as many as 31·8 per cent. In only 11 of the 66 cases which gave a positive reaction were stigmata of syphilis found. On the other hand, among the cases which reacted negatively were 3 with flattening of the bridge of the nose, 1 with Hutchinson's teeth, 7 with suspicious teeth, and 5 with keratitis. These figures, taken in conjunction with others the result of several different investigations, show that syphilis plays a greater part in the etiology of mental deficiency than was formerly supposed.

W. M. Elliott[2] has used the test to ascertain whether the wasted and unhealthy condition so often found in the children of the poorer classes has a syphilitic basis. A number were examined, with consistently negative results. Afterwards every child admitted to two wards was tested, 130 being examined in this way, the method employed being that recommended by Browning and Mackenzie: 4 cases showed definite signs of the disease, and all these gave a positive reaction; 10 others also reacted positively. Excluding the cases with obvious signs of syphilis, the percentage of positive reactions was approximately 8·5. If a positive Wassermann reaction is taken as an infallible indication of syphilis, these figures indicate that the disease is common among the poorer classes of Glasgow, where the investigation was carried out.

The negative results obtained by Elliott in unhealthy wasted children agree with the conclusions of Holt,[3] who records that in 62 marasmic infants a positive reaction was obtained in only 5, and that these were included in 11, of whom 7 showed clinical signs of syphilis. Yerington and Holsclaw,[4] too, obtained only 8 positive Wassermann reactions in 100 marasmic infants in whom no physical signs of syphilis were detected. As Hubert Armstrong[5] says, "In congenital syphilis of the very young, diagnostic signs, when looked for, are generally not wanting." If syphilis plays any part in the causation of marasmus which is otherwise unexplained, he thinks that it is by its toxic influence upon the ovum.

Abner Post[6] quotes the statistics given by Fournier of 500 syphilitic families with whose history he was acquainted. No transmission to the next generation occurred in 223 families, but the offspring was affected in 277. In the 500 families 1127 pregnancies took place: 600 children were reported as living and well; 527, or 46 per cent of the pregnancies, resulted unfortunately. Abortions or still-births occurred in 230, early deaths in 245, surviving syphilitic children in 38, and mentally deficient children in 14. Post has followed up a similar line of enquiry in Boston with respect to 30 families. Resulting from 168 pregnancies, there were 53 still-births and miscarriages, and 45 early deaths, a mortality of 57 per cent; 71 survived, and of these, 32 were the subjects of syphilis of sufficient severity to seek treatment. These statistics form a strong argument in favour of the notification of the disease.

Manifestations.—Armstrong[7] draws attention to some of the rarer or less recognized manifestations of congenital syphilis. Monstrosities, he thinks, following as they do a series of abortions or miscarriages, are sometimes due to this disease. He records such a case, and also one of gangrene of the foot which recovered under antisyphilitic treatment. In this connection two cases described by Bosanyi,[8] of gangrene resembling Raynaud's disease, and occurring in congenital syphilitic patients, are of interest. Ager[9] obtained a positive Wassermann reaction in a case of paroxysmal hæmoglobinuria in a girl whose attacks began at two years of age, and collected 16 others occurring in

congenital syphilis. Armstrong refers to nephritis as an early manifestation; œdema is generally, but not always, a prominent symptom, and after death, microscopical examination of the kidney may be necessary to demonstrate the true nature of the case; its frequent presence is a factor to be considered in salvarsan therapy. He is of opinion that some of the examples of cerebral diplegia are of antenatal and syphilitic origin. Among other nervous lesions he mentions meningitis and hemiplegia. The meningitis is generally basal, and the clinical picture that of the posterior basic form. The diagnosis is made by lumbar puncture and examination of the cerebrospinal fluid, which will be sterile and contain an excess of lymphocytes. Either it or the blood may give a positive Wassermann reaction. The immediate prognosis is better than that of posterior basic meningitis; but blindness, deafness, and mental impairment are likely to be more permanent if the patient survives. Hemiplegia of syphilitic origin may be recognized, according to the author, by the following features: it is often preceded by convulsions at a longer or shorter interval before the attack, it is often recurrent, headache and vomiting may lead up to the paralytic seizure, and it may occur silently and acutely (Box).

J. H. Sequeira[10] draws attention to a serious late manifestation, which is often mistaken for lupus (*Plates LVI, LVII*). The patients are from 8 to 15 years of age. A history of injury is common. The rapidity of the destruction is quite unlike that met with in lupus vulgaris, the amount occurring in a few weeks being as great as a tuberculous process takes years to produce. Unlike lupus, it causes destruction of bone, so that the presence of dead bone in the discharge from a nasal or palatal ulceration is valuable evidence in favour of syphilis. The lesions respond remarkably to anti-syphilitic treatment, whether salvarsan, neosalvarsan, or mercury. Treatment should be started at once, as a delay of even a few days may do irreparable harm.

Treatment.—The results of treatment by **Salvarsan** have hitherto been very contradictory (*vide* Medical Annual of the last few years). There is no doubt, however, that recently they have improved somewhat. J. W. Simpson and Lewis Thatcher[11] ascribe this chiefly to two causes: (1) The administration of an approximately correct dose, usually 0·01 gram for every kilo of the child's weight; and (2) Improved method of injection. This consists in cutting down on the selected vein, laying it bare, opening it, and then inserting a cannula, as in transfusing. In children up to the age of three or four, they prefer the external jugular vein. After that age the arm veins may be used. They do not advise injection into the scalp veins of infants, as these veins collapse when their sheath is opened, and become very small. Leonard Findlay, on the other hand, prefers the veins of the scalp, piercing them directly by an injecting needle. Simpson and Thatcher advise against the use of a hypodermic needle. These authors have come to rely on a positive Wassermann reaction of the mother as an indication of syphilis, and in cases of doubt examine her blood instead

PLATE LVI.

INHERITED SYPHILIS

Fig. A.—Ulceration of a few weeks' duration.

Fig. B.—Ulceration of lips and cheek of three months' duration. Hutchinson's teeth.

Kindly lent by Dr. J. H. Sequeira

PLATE LVII.

INHERITED SYPHILIS—*continued*

Fig. C.—Rapid destruction of nose and lip. Gummatous ulcer of eyebrow

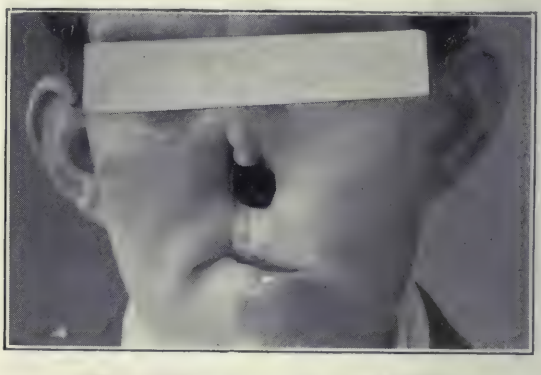

Fig. D. Complete destruction of nose and lip

Fig. E.—Profile of patient shown in *Fig. D.*

of that of the child. During the past twelve months they have treated 40 cases with 7 deaths; the others are alive and progressing favourably. The only reactions noticed were an increase of temperature in about half of the cases, and bronchitis in two. In only one did any recurrence of symptoms follow the treatment. They conclude that salvarsan is a potent remedy, and with proper dosage and technique can be used with safety in the youngest children. In very severe cases the dose should be reduced to perhaps half of the usual. Compared with mercury, salvarsan gives, in their experience, much better results. They recommend, however, that treatment by **Mercury** should be continued after salvarsan has been used.

The relative therapeutical value of salvarsan and neosalvarsan is still *sub judice*. **Neosalvarsan** has certain advantages in the ease with which a dose can be prepared, and the smallness of its volume. J. L. Bunch[12] prefers it to salvarsan in the treatment of this disease. He dissolves the powder in a sterile 0·4 per cent saline solution made with freshly distilled water. The quantity of fluid is calculated on the basis of 25 c.c. to each 0·15 gram neosalvarsan for intravenous injection. As the injection of a cold solution is disagreeable to the patient, he makes a practice of warming the salt solution to a temperature of 65° before adding the neosalvarsan. It is necessary to inject the solution immediately after it has been prepared, and since the oxidation-products are toxic, it must not be warmed after it has been made up. The simplest way of calculating the dose is to take 0·15 gram per kilo of the body weight. The amount to be injected is less than 10 c.c., and if the median basilic or external jugular vein be exposed, a needle can be inserted and the fluid injected without difficulty. If the external jugular vein cannot be brought into prominence, it may be possible to utilize the temporal vein, but the patient's skull is not so satisfactory a support for the operator's hand, and there is a risk of the needle slipping out of the vein. To obviate the danger of injecting the drug into the soft tissues around the vein, he recommends that two syringes be used, one containing saline and the other the neosalvarsan. The needle is first inserted attached to the syringe containing the saline; if this runs freely, the syringe is replaced by that holding the drug, and the injection proceeded with. It is wise to start with small doses, and the drug should not be employed if there is serious cerebral or renal disease, or albuminuria. He finds the Wassermann reaction of little value as a guide to treatment. The chief indication for the drug is, in his opinion, in those cases where rapidity of action is of prime importance.

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TABES DORSALIS. (*See* SYPHILIS, CEREBROSPINAL.)

TACHYCARDIA, PAROXYSMAL. *Carey Coombs, M.D., M.R.C.P.*

Etiology.—Hutchison and Parkinson[1] record a case of paroxysmal tachycardia in a child of 2½ years. During the attacks the heart became dilated, and œdema and other evidences of circulatory embarrassment were manifest, but there does not appear to have been any organic disease of the heart. Kidd[2] reports a case in a boy, age 4½ years, which ended fatally. The heart was greatly dilated, especially the right ventricle. The valves were normal. There are very few recorded examples of this condition during childhood.

Pathology.—Butterfield and Hunt[3] made histological examinations of the heart in three fatal cases. In one, electrocardiograms showed that the alteration in rhythm arose in the ventricle, and the lesions discovered post mortem were most prominent in the interventricular septum. In the others, the graphic records showed that the origin of the tachycardia was supraventricular, and in each of these the most definite morbid changes lay in the neighbourhood of the sino-auricular node. These reports are of interest, since they afford examples of anatomical confirmation post mortem of physiological data collected during life.

Symptoms.—Esmein and Donzelot[4] describe the case of paroxysmal tachycardia in which the attacks, if prolonged, led to brief loss of consciousness. This is a rare complication, and, though alarming, not threatening to life. They ascribe it to cerebral anæmia induced by the attack and occurring in subjects who, like their own patient, are of a neurotic disposition.

References.—[1]*Brit. Jour. Child. Dis.* 1914, 241; [2]*Ibid.* 264; [3]*Quart. Jour. Med.* 1914, Apr. 209; [4]*Presse Méd.* 1914, 489.

TALIPES. (*See* Paralytic Deformities.)

TETANUS. *Purves Stewart, M.D., F.R.C.P.*

The high mortality in this disease, despite treatment by tetanus antitoxin, has led some clinicians seriously to doubt the value of antitoxin treatment, once the symptoms have developed, and to regard its usefulness as being limited mainly to prevention rather than cure. The mortality tables of many hospitals support this somewhat gloomy view. On the other hand, smaller groups of carefully-observed cases, e.g. the series of twenty-three cases recorded by Ashurst and John[1] (to which we directed attention in last year's Medical Annual) tend to show that, with adequate doses and when administered sufficiently early and by suitable channels, **Tetanus Antitoxin** has a notably beneficial effect in lowering the mortality. Irons,[2] of Chicago, has published a valuable analysis of 225 cases of tetanus treated by antitoxin in various large hospitals in the United States between the years 1907 and 1913. The gross mortality of these 225 cases was 61·8 per cent. Compared with these, 21 other cases, untreated by serum, gave a mortality of 85·7 per cent. The number in the latter class is too small to establish the mortality of untreated tetanus, but it agrees broadly with the statistics of

Permin,[3] who in a series of 199 cases treated without serum, found a gross mortality of 78·9 per cent. Irons points out that in many cases, by the time tetanus symptoms have developed, the patient is already beyond hope, the toxin having pervaded both the peripheral nerves and the central nervous system, so that, even although antitoxin be administered, death is inevitable. Nevertheless, he urges the immediate injection of antitoxin, preferably by intraspinal injection and also intravenously. Intraneural, intramuscular, and subcutaneous injections, in the above order, are less rapidly absorbed, and correspondingly less likely to be efficient. Moreover, the dosage of antitoxin must be adequate. Less than 3000 units is apparently useless. Irons suggests giving 3000 units intraspinally, together with 10,000 to 20,000 units intravenously, at the earliest possible moment after symptoms appear. On the following day the intraspinal injection of 3000 units may be repeated. The blood remains antitoxic for several days after an intravenous injection. If only a small amount of antitoxin is available at the start (3000 units or less), it should be given intraspinally.

Treatment by antitoxin, however, should not exclude other recognized methods of treatment. Thus, surgical treatment of the infected wound should be energetically carried out. The patient should be kept in a darkened, quiet room, and should receive sedative drugs such as **Chloretone** or **Chloral** in full doses.

Intraspinal injections of **Magnesium Sulphate,** as originally introduced by Meltzer and Auer in America, and to which Kocher in Europe has specially directed attention, sometimes have a beneficial action, mainly by temporarily suspending the functions of the intensely irritable spinal cord. Stromeyer,[4] of Jena, records a series of five cases treated by repeated intrathecal injections of a 15 per cent solution of magnesium sulphate, 8 c.c. being injected after a preliminary washing-out with normal saline solution. One, or at most two, injections were given. Four patients out of five died, although it must be admitted that in two of them severe pneumonia was also present, which would probably have been fatal independent of the tetanus. It is interesting to note that in two of Stromeyer's cases temporary extensive anæsthesia of the lower limbs and trunk appeared, obviously of medullary type, whilst in the other three cases, treated with identical doses, no anæsthesia was observed. In one of the anæsthetic cases intense bedsores appeared over the sacrum, heels, and shoulder-blades. This patient, however, notwithstanding a double pneumonia, subsequently made a complete recovery. All five cases after injection with magnesium sulphate showed as constant phenomena, sleep, cessation of tetanic spasms, relaxation of muscular rigidity, diminution of reflexes, and slowing of respiration. Respiratory failure, a danger emphasized by Kocher, did not occur in any of Stromeyer's cases, possibly because of the moderate doses employed. Stromeyer is inclined to increase the dose in future cases.

Intramuscular injections of 2 c.c. of a 4 to 5 per cent solution of

Carbolic Acid are often of great value, repeated every hour until 80 to 100 cgrams of phenol have been given in the first twenty-four hours. These injections are continued for several successive days, sometimes for a week, gradually diminishing the daily amount as the symptoms subside. Numerous successful cases following this carbolic acid treatment continue to be reported. Thus Clifford Mayer,[5] of Baroda, collected seventeen cases, of whom seven died in hospital, and two others were removed by their friends, so that further notes as to the result were not available. Four were discharged cured, and the remaining four were much improved when their friends snatched them from hospital care. If we class these 'cured' and 'relieved' cases together, this gives a percentage of cures amounting to 47 per cent, a highly satisfactory figure in view of the usually appalling mortality.

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TETANY.

(*Vol.* 1913, *p.* 491)—In those rare cases where this is associated with dilatation of the colon, colonic lavage with weak solutions of **Sodium Bicarbonate** is recommended by Langmead.

THORAX, SURGERY OF. (*See also* TUBERCULOSIS, PULMONARY.)

F. W. Goyder, F.R.C.S.

Chronic Empyema.—Treatment has hitherto been unsatisfactory. Good results have frequently followed Estlander's operation, especially if combined with removal of the parietal pleura. This operation, however, usually causes a good deal of shock, and more than one sitting is often necessary. Mayo and Beckman[1] report six cases of successful removal of the visceral pleura, followed by healing of the wound and expansion of the lung. This latter result never follows Estlander's operation. The authors find that the shock is much less than after Schede's method, and the hæmorrhage is surprisingly slight. The patients are usually as much in need of preparatory treatment as those about to undergo prostatectomy. Before the actual operation, drainage should be established at the lowest point of the cavity, autogenous vaccines should be employed, and when further improvement ceases, irrigation of the cavity with weak iodine solution helps to reduce the infection. At the operation sufficient exposure must be obtained to make every part of the cavity accessible. No note of the incision employed is given, but it is stated that extensive resections of ribs are not always necessary. The cavity is cleansed as thoroughly as possible, and then swabbed with strong tincture of iodine. The incision through the thickened pleura is best begun posteriorly along the vertebræ, as there is less danger, especially on the left side, of entering the pericardium. One need not fear slitting entirely through the thickened pleura down to the healthy lung, as the bleeding does not seem to be excessive, and although the lung has been injured enough to allow

air bubbles to escape, no harm has arisen and no extensive infection of the lung has taken place. Pneumonia has not occurred. Abundant drainage should be provided. The operation may be divided into stages when necessary.

Empyema. — Wilms[2] describes a method of dealing with *long-standing tuberculous pleural effusion*, which he says is less dangerous and more successful than the usual methods The pleural cavity is not interfered with, but the ribs are removed a few at a time, from the eleventh to the first if necessary, through a vertical incision, under local anæsthesia, excision of the posterior ends often proving sufficient. The modern pneumothorax operation has greatly increased the frequency of tuberculous empyema ; although absorption of the fluid occurs in many cases, in others operation becomes necessary, and since the lung is incapable of expansion, the chest wall must be made to collapse. Occasionally a small plastic operation of the Schede type may also be required.

Torek[3] points out that this method and similar ones, in addition to a somewhat high mortality, have the disadvantage of producing mediastinal instability, from lack of support on one side of the chest. The respiratory oxygenation of the blood is deficient, as the mediastinum is drawn to the unoperated side on inspiration, and forced towards the operated side on expiration. In consequence, the lung on the unoperated side is neither satisfactorily expanded nor properly emptied The lack of support on one side of the chest is also responsible for a certain amount of to-and-fro breathing between the two lungs, the expired air from the better lung being to some extent forced into the collapsed lung and breathed back again on inspiration. Of course the air thus passing from lung to lung does not become oxygenated. Tight strapping of the operated side overcomes these difficulties to some extent. He advises opening the pleural cavity, and separating the adhesions between parietal and visceral pleura with the finger, or scissors if necessary, afterwards closing the pleura with the lung in collapse and without drainage. The only danger is the opening of a cavity in the lung and the establishment of a valve-like opening into the pleura, so that air escapes thither from the lung without being able to return. This is apt to produce surgical emphysema and subsequent infection. The accident can be avoided by careful separation ; if it occurs, the opening in the lung must be sutured. A case described was successful as regards collapse of the lung, but death ensued as the result of profuse and intractable diarrhœa in the fifth week after operation.

Pulmonary Abscess and *Bronchiectasis.*—Lilienthal[4] gives the results of operation on eleven cases. Five of these had bronchiectasis, and one died in hospital ; the others were more or less improved. There were three cases of acute abscess, and two of the patients recovered. One of chronic abscess recovered, one of acute extensive gangrene died, and one of fœtid bronchitis with minute abscesses died. The two-stage operation in certain forms of true lung abscess may be an

advantage. If the operation is to be performed with a view of resecting the diseased lung, one sitting is best. Drainage of a lung abscess by thoracotomy is likely to result in cure. Drainage of large infected bronchiectases may be followed by improvement, but complete recovery is unlikely. Exploration of the pleural cavity and of the lungs by intercostal thoracotomy, is feasible and reasonably safe. Extirpation of a bronchiectasis by removal of the affected portion of lung may lead to complete recovery, but the danger of the operation is great. Artificial pneumothorax and Tuffier's extrapleural tamponade should be reserved for cases of pure tuberculosis. Operations involving one lung can be performed with inhalation anæstheia. No major work through the thoracic cavity should be undertaken without full narcosis.

F. T. Murphy[5] says that untreated abscess has a mortality of 80 per cent, whereas after operation the death-rate is 17·5 per cent. Drainage without infection of the general pleural cavity can be accomplished with certainty only when instituted through adhesions between the parietal and visceral pleura. Nature herself provides these adhesions in approximately 50 per cent of the cases. In others they may be produced by a two-stage operation, the first consisting in suture of the lung to the parietal pleura, or packing of gauze over the surface of the parietal pleura, and the second in incision and drainage of the abscess. He thinks that general anæsthesia should be reserved for cases in which preliminary exploration of the lung is necessary on account of failure to localize the cavity, and in children. Nitrous oxide with oxygen is the anæsthetic of choice. The intratracheal insufflation method is superior to positive and negative pressure. In all other cases he advises local anæsthesia for the preliminary operation ; for the opening of the abscess, after infiltration of the local area, no anæsthetic other than morphia or scopolamine is required.

Meyer[6] points out that early cases of bronchiectasis never reach a surgeon owing to the difficulties of exact diagnosis. It is only at the beginning that operations such as artificial pneumothorax or multiple rib-resection can possibly be curative, since in the later stages, though the lung may collapse, the cavities cannot. These measures are, however, of use as preliminaries and adjuncts to other forms of treatment. Pneumotomy is valuable, but only where the cavity is single. If no pleural adhesions are found, Meyer advises stitching of the lung to the pleura, and drainage of the abscess at the same sitting. Thoracoplasty, and pneumolysis with extrapleural tamponage (Tuffier) in advanced and multiple cases produce great improvement, but do not as a rule result in cure. The same may be said of division of a phrenic nerve. The paralyzed half of the diaphragm may as the result rise as high as the second or third rib. Ligature of the pulmonary artery results in carnification of the lung with connective-tissue proliferation, and when combined with other methods, the diminution in expectoration may be very striking, but complete cure rarely follows. This

can only be expected from pneumectomy, which has at present a mortality of 50 per cent, but if successful is likely to cure the condition. Meyer concludes that the facts should be put before patients, and they should be allowed to choose between an operation entailing comparatively little risk, to be done in stages, causing the lung to collapse and ameliorating the symptoms, and the other consisting in extirpation of the diseased lobe or lobes, which may cure but is still a dangerous procedure. Mumford and Robinson[7] remind us that the removal of a foreign body has not infrequently arrested bronchiectasis ; they believe that in the earlier stages, nitrogen-gas injection producing artificial pneumothorax should always be tried ; and that in late cases, where the disease is obviously confined to one lobe, lung resection is the sole hope of surgical cure. Surgeons should first produce compression of the lung by artificial pneumothorax or pulmonary arterial ligature ; second, and much later, the lobe affected should be excised.

Kelly[8] reports an interesting case of recovery after operation for *abscess of the bronchial glands*. The disease had lasted nearly eight months before the abscess could be located, in spite of repeated exploratory punctures and exploration of the chest and abdomen. *X*-ray examination finally revealed a shadow at the root of the right lung. As the condition appeared certain to result in death if unrelieved, this region was explored by the removal of three inches of the third and fourth ribs at their junction with the cartilage. A dense inflammatory mass was revealed. This was explored with the finger, and at a depth of 2½ in. an abscess cavity was reached just above or in the root of the right lung, firm-walled and not connected with a bronchus. After drainage the patient recovered, though reaccumulation took place once. Ultimately recovery was complete.

References.—[1]*Ann. Surg.* 1914, i, 884 ; [2]*Deut. med. Woch.* 1914, 683 ; [3]*Surg. Gyn. and Obst.* 1914, ii, 1 ; [4]*Ann. Surg.* 1914, i, 855 ; [5]*Ibid.* ii, 36 ; [6]*Ibid.* 7 ; [7]*Ibid.* 29 ; [8]*Austral. Med. Gaz.* 1914, 524.

THREAD-WORMS.

(*Vol.* 1914, *p.* 605)—To prevent constant reinfection through contamination of the hands, an ointment containing Camphor, Quinine, and Thymol should be applied to the anal region after each defæcation, and the hands and nails thoroughly cleansed.

THYMUS, ENLARGED.—(*See* Status Lymphaticus.)

THYROID, SURGERY OF. *F. W. Goyder, F.R.C.S.*

The chief interest at the present time in this branch is in the operative treatment of *exophthalmic goitre*. It is important to define what is meant when using this term, for as Berry[1] points out, the prognosis and operative risks are quite different in typical Graves's disease and in simple goitre with symptoms of hyperthyroidism. Exophthalmos, goitre, tachycardia, and tremor form an unmistakable clinical picture, and for statistical purposes these should be put in a class by themselves. Discussing the extent of benefit, Berry says that immediate and complete cure but rarely results from operation in well-marked

cases. In the minor forms in which exophthalmos is absent, immediate and complete cure is common enough. In pronounced cases, although cure is less rapid and certainly less complete, the outstanding feature is the great amount of benefit that patients have almost always received as the direct and speedy result of the operation. A feeling of well-being sets in; the pulse-rate drops gradually and steadily, often falling in a week or two from 120 or 130 to 80 or 90. Exacerbations and palpitation become less frequent. The body-weight and general nutrition improve; the exophthalmos is least affected. A similar amount of benefit may follow medical treatment, but this is usually very slow and uncertain. Those who can afford to lie up for one or more years may succeed in wearing out the disease, if in the meantime they have not died or become the subject of incurable dilatation of the heart, or some other visceral complication due to the long-continued toxæmia. It is on account of the possibility of spontaneous cure of the disease that he does not recommend operative treatment, with its manifest even if comparatively slight risks, to all patients in the earliest stage of the disease. But medical treatment, unless followed speedily by marked and steady improvement, should not be persisted in for more than two or three months. It can certainly be said with truth that there is no drug yet known, nor any method of medical treatment, which produces such marked improvement in the symptoms of Graves's disease, or does it so speedily, as does a well-planned and well-executed surgical operation. Berry had one death in twenty-four thyroidectomies, and no mortality in twelve ligature operations. Ether is the best general anæsthetic; the mortality under chloroform appears to be much higher.

C. H. Mayo[2] says that the various types of goitre should be treated both medically and surgically. Many goitres of the simple and mild exophthalmic type undoubtedly recover spontaneously. Simple colloid goitre which has resisted treatment, and encapsuled adenomata, are best treated by removal of the diseased portions of the gland. Without operation such glands will expose the individual to a serious menace later in life, since the degeneration which follows in an average of fourteen years, may be of such a character as permanently to damage the heart, kidneys, and liver. During middle life such degeneration frequently follows the ill-advised use of iodine. Exophthalmic goitre is distinguished from all other toxæmias by the parenchymatous increase of the thyroid. Exophthalmos occurs in no other systemic condition. It is essentially a chronic disease presenting exacerbations and ameliorations extending over a period of months or several years. After the first year the gland often undergoes a regression. During periods of exacerbation all patients should be considered as medical cases. Surgery is indicated in the up-wave of improvement. Extreme conditions, especially dilatation of the heart, may require medical preparation, and the operative interference following in cases resistant to treatment should be confined to injections of boiling water. In most of the severe cases a ligation is made, first of the left

upper pole only. Should reaction following this be severe, ligation at the right upper pole is indicated a week later, and thyroidectomy reserved until four months have elapsed, by which time the patients have made an average gain of 22 lb., with great general improvement. However, if the reaction following the left ligation is not unduly severe, a partial thyroidectomy may be made at the second operation the week following.

Walton[3] reports ten cases operated upon for this condition, all with great relief of symptoms, and one completely cured. In all, partial thyroidectomy was performed, and all were definite cases of Graves's disease. He also lays great stress on the careful choice of a favourable time for operation, the avoidance of periods of exacerbation, preliminary rest in bed if the symptoms are marked, and the allaying of mental excitement.

Clinical and pathological study of large numbers of cases of hyperthyroidism has enabled C. H. Murphy[4] and his colleagues to make clear distinctions between true Graves's disease and other forms of goitre associated with hyperthyroidism. True Graves's disease shows marked primary hypertrophy and hyperplasia of the parenchyma of the thyroid. The stage of development of the disease and the degree of severity of the symptoms, are directly associated with the degree of advancement of the pathological condition. In toxic non-exophthalmic goitre, and in non-toxic simple goitre, except in cases with clinical signs of true exophthalmic goitre, there is no considerable hypertrophy and hyperplasia of the parenchyma. Atoxic simple goitre is a chronic process characterized by atrophic parenchyma and decreased function and absorption. Toxic non-hyperplastic goitre is of two types, in one of which (Group II of Plummer) atrophy of the parenchyma is followed either by increased parenchyma from regenerative changes, or by new parenchyma of the fœtal type, with increase of secretory activity and absorption. The condition, though chronic, is sufficiently acute to cause the patients to seek advice earlier than those of the next group. This includes the cases of toxic goitre with cardiovascular symptoms (Group I). They resemble cases of simple goitre rather than those of Group II. They are mainly of the colloid goitre type, and develop toxic symptoms later than the cases in Group II. The average age of onset of typical Graves's disease is 32 years ; toxic symptoms begin nine months later. In those cases which later simulate Graves's disease, the average age of onset of the goitre is 22 years. Toxic symptoms occur at the average age of 36·5 years.

"Let us . . . assume that there are three toxic elements in the thyroid secretions, one damaging chiefly the nervous system, one the circulatory system, and the third producing exophthalmos. In exophthalmic goitre all three elements are in excess, but the clinical picture is dominated by a nerve toxin, although in individual cases the circulatory toxin or the element producing exophthalmos may seem to be in excess.

"The intoxications from non-hyperplastic goitre may be divided

into two merging groups: (1) In which the cardiac toxin predominates, in which the clinical picture closely resembles and in many instances cannot be differentiated from the cardiovascular complex resulting from alcoholic, luetic, septic, and other well-known toxins; (2) A group more closely approaching the picture of Graves's disease, and including the cases that have been erroneously so diagnosed by the mass of the profession. In this group are those cases in which there is degeneration of encapsulated adenomata. While they do not have exophthalmos, in lieu of this they may have the staring and widening of the palpebral fissure. The pulse is irregular in tension and rhythm. Circulatory changes and muscular weakness are marked.

"The average lapse of time between the appearance of non-hyperplastic goitre and toxic symptoms is 14·5 years. That the patient comes under observation three years later indicates that the onset is usually insidious. Nervousness, tremor, and loss of strength and weight, as a rule develop slowly, but may appear suddenly long before definite evidence of myocardial damage.

"In some cases the clinical aspect, as noted above, closely approaches that of exophthalmic goitre. However, the symptoms are less complex, less definitely associated, and, except for a damaged heart, less intense. There is much evidence to suggest that during the 14·5 years previous to the onset of definite toxic symptoms, many of the cases of non-hyperplastic thyroid may . . . develop arteriosclerosis, in many cases showing the combined picture of thyrotoxicosis and arteriosclerosis. The development of a typical syndrome of Graves's disease in a case having a definite history of simple goitre, means that the hyperplastic goitre has been superimposed upon the simple type.

"The onset of exophthalmic goitre is, as a rule, relatively acute and the course of the disease fairly definite. The clinical picture early in the history is that of a toxin acting directly on the more vital organs, more notably on the central nervous and vascular systems. Later it is made more complex by the interaction of those organs whose function have been directly disturbed by the toxin. The order of onset of the most important symptoms . . . is as follows: (1) Cerebral stimulation, (2) vasomotor disturbances of the skin, (3) tremor, (4) mental irritability, (5) tachycardia, (6) loss of strength, (7) cardiac insufficiency, (8) exophthalmos, (9) diarrhœa, (10) vomiting, (11) mental depression, (12) jaundice, and (13) death."

Hypothyroidism.—Wagner[5] describes cases in which operation has been of benefit in this condition. They are almost exclusively associated with goitre. In one case of myxœdema, however, there was a small thyroid, and an excellent result followed exothyropexy. Simple division of the isthmus often has a marked effect in reducing the size of an ordinary goitre and improving myxœdema where signs of this are also present. In neither form of operation is there any removal of tissue, and yet good results follow. He describes a case reported by Neudorfers in which two typically myxœdematous

brothers were cured by hemi-extirpation of enlarged thyroids. After Cathcart had removed the left half of a goitrous thyroid for dysphagia and dyspnœa, signs of myxœdema of twenty years' standing disappeared. The author has operated also on two cretinous dogs both with bilateral goitre, by extirpation of one lobe. In both cases the dogs developed normally, and the remaining halves of the thyroids diminished in size. He believes that reaction following trauma may be the common factor in stimulating normal thyroid metabolism in all these cases; hence he advises, in cases of myxœdema, removal of the goitre if present, or division of the isthmus.

Balfour,[6] of the Mayo clinic, in cases of *diffuse colloid adenoma*, especially where long-continued pressure has caused softening of the rings of the trachea, advises division over both lobes of the thin peritoneum-like fibrous covering of the gland, dislocation if possible of both lobes by careful finger manipulation within this capsule, division of the isthmus, and outward separation of the deep surface of both lobes, sufficiently to permit of an adequate bilateral resection. A sufficient amount of thyroid tissue is then cut out on each side in the form of a wedge, the remaining portions with their capsule being closed by a continuous catgut mattress suture which controls hæmorrhage and obliterates the cavity. Finally, a locking continuous stitch unites the anterior to the posterior capsule. In different cases a varying amount of thyroid tissue has to be removed, but in no case have bad results followed free extirpation. The relief of pressure on the trachea early in the operation, and the symmetry of the result, are good points in this procedure. Hæmorrhage, too, is easily controlled.

All forms of goitre appear to be common in the hilly districts around Nepal (Rhatmunda); and Das Gupta,[7] obtaining no good results from local and medical treatment, operated upon some cases, chiefly adenomata, with good results. In one case of colloid cysts, he appears to have removed both lateral lobes, leaving only the isthmus with a small amount of thyroid tissue on each side. No ill effects followed.

Simon[8] reports the results of a commission appointed to enquire into the *Prevalence of Goitre in Silesia*. The results were not in favour of any particular theory as to its causation, except that water-courses are connected in some way with its spread. There was no evidence in favour of the contact theory. The numbers of goitrous patients were sufficient to form a regiment annually. The larger forms were most common near the mountains. Symptoms were most frequent in the spring and winter, though the glands were larger in the summer. It was less frequent away from the source of rivers. No definite results were obtained with regard to its relation to geological formation, or prevalence in certain houses. The new-born and sucklings were occasionally attacked. One epidemic had been observed in which 86 out of 143 boys and 16 out of 23 girls had been attacked. It was less frequent as the social conditions improved. The habit of carrying weights from the neck seemed to have some share in the

causation. It was more than six times more frequent in women than in men. In some neighbourhoods half the population was affected. It was found in domestic animals, particularly hunting dogs. Eighty per cent of the cases were found in natives. Graves's disease varied in different localities from 1 to 50 per cent.

REFERENCES.—[1]*Brit. Jour. Surg.* 1914, Apr. 699; [2]*Surg. Gyn. and Obst.* 1914, i, 322; [3]*Lancet*, 1914, i, 1387; [4]*Surg. Gyn. and Obst.* 1914, ii, 351; [5]*Wien. klin. Woch.* 1913, 1532; [6]*Ann. Surg.* 1914, i, 671; [7]*Ind. Med. Gaz.* 1913, 390; [8]*Berl. klin. Woch.* 1914, 878.

TINEA CAPITIS (TROPICALIS). *Sir Leonard Rogers, M.D., F.R.C.P.*

A. J. Chalmers and A. Marshall[1] have studied this condition in Anglo-Egyptian Sudan, and found only one species of trichophyton, which differs somewhat from those usually described. After dealing with the history of the differentiation of this class of parasite, they describe the Sudan form. The head of the patient shows white patches with hairs broken short, which contain ribbon-like chains of quadrangular double-contoured so-called spores. The cultural characters are carefully described and illustrated, and its differentiation from other varieties is considered at length. The best remedy is **Tobacco-Soap** made by C. Mentzel, in Bremen, which does temporary good only.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1914, 257.

TINEA VERSICOLOR. *E. Graham Little, M.D., F.R.C.P.*

Oppenheim[1] recommends for the treatment of this parasitic disease a lotion of **Sodium Sulphite** 10, distilled water 100.

Plate LVIII illustrates a widespread eruption of tinea versicolor in a young male patient. The appearance of this eruption is not unlike that of the pigmentary syphilide, from which it can be most definitely distinguished by finding in the scales of tinea versicolor the characteristic fungus and spores. The combination of mycelium and spores, the latter occurring in bunches, serves to differentiate the microscopical appearances of tinea circinata from tinea versicolor. The latter parasite, moreover, will not grow on culture media on which the parasites of tinea circinata flourish. *Microsporon furfur*, the parasite of tinea versicolor, would, in fact, seem to have curious selective affinities for certain skins; for two persons, one affected with the disease, the other not, may sleep together without transmission of the disease, as in a case recorded by Graham Little,[1] where two brothers slept together for ten years, during all of which time one brother had the eruption and the other escaped contagion.

REFERENCE.—[1]*Derm. Woch.* 1913, xxxi, 936.

TOBACCO POISONING. *Herbert French, M.D., F.R.C.P.*

Favarger,[1] after numerous experiments upon mice, guinea-pigs, rabbits, and dogs with nicotine and various derivatives of tobacco, concludes that the conditions of experiments are so very different from those of ordinary smoking, that the results are not to be compared. He is inclined to think that it is the products of resin in the

PLATE LVIII.

TINEA VERSICOLOR

E. Graham Little, M.D.

tobacco rather than nicotine which do the damage ; and he believes that those tobaccos which contain the highest proportion of tobacco resin are the most harmful to smoke. He gives it as his opinion that smoking is not important as a cause of arteriosclerosis.

Cornwall[2] has carried out a series of observations upon the effect of chronic tobacco poisoning on the blood-pressure. Patients with symptoms of tobacco heart had blood-pressures below the normal, the systolic ranging between 85 and 115 mm. Hg, the diastolic between 60 and 75 mm. Hg ; the pulse-rate was not necessarily rapid, notwithstanding the presence of cardiac symptoms. It was found that the systolic pressure was generally lowest when the subjective cardiac symptoms of tobacco poisoning were most pronounced, whilst brisk exercise caused a uniform fall in both the systolic and diastolic pressures.

Bush[3] has made some ingenious experiments to determine the effect of tobacco smoking on mental efficiency, and his general conclusion is that it does render the brain powers less active. The question is a very important one, and although, speaking in a general way, one would be disinclined to believe that smoking was a bad thing for the mental powers, Bush's tests were apparently very thorough, and they merit considerable attention. The subject being seated at ease and reasonably free from the effects of any immediately recent smoking, was requested to respond to the tests with the greatest possible speed and spontaneously, inasmuch as each test would be accurately timed or otherwise gauged. The first test employed was the so-called 'E' test, wherein the subject is required to cross out all the 'E's' in several lines of unspaced capitals ; this experiment tests simple perception. To obviate any undue gain from experience, the secondary test employs 'A' instead of 'E.' The second test was that of 'chain association.' In this the subject is required to say in ten seconds all the words that flow through his mind, the initial word being one suggested each time by the operator from a given series. An average is made of five tests, no test being counted unless it contains six or more words. This test shows the freedom of linking association, one object memory leading with varying rapidity into another. The third test was 'limited association.' Sets of cards were prepared, each card containing ten meaningless syllables of two letters each. The subject was required to write down in the briefest possible time whatever words the syllables suggested, one word for each syllable. The fourth and fifth tests carried the faculty of association higher in the psychical scale. The fourth, 'controlled association,' required the subject to name an autonym for each of ten words on a card. The fifth test, 'genus species,' required the naming of a particular kind for each of ten words representing general classes. The sixth test concerned itself with visual memory. A series of spaced capitals were arranged in rows of arithmetical progression, beginning with four.; only one row was exposed at a time, the exposure being for as many seconds as there were individual letters in the row.

If a subject could memorize five discrete letters in five seconds, could he memorize nine in nine seconds, and would smoking increase or diminish his memory capacity? In the seventh test, ten words were read slowly; the subject was then required to write from memory as many words as he could recall, thereby testing auditory memory. In the eighth test a series of ten nouns was given, and the subject requested to write down swiftly whatever each word suggested to his mind. This series was followed by a series of ten verbs for a second like test, thereby measuring rapidity of imagery. The ninth and tenth tests were similar, the ninth being tests of speed in adding several columns of figures, and the tenth tests of speed in problems of subtraction. Higher tests were contemplated, but all such were abandoned later because of the apparent impossibility of arranging a series (of syllogisms, for instance) of acceptable equality of degree.

The subjects volunteering for this series of experiments were all medical students, ranging in age from twenty-one to thirty-two years, of varying previous experience, from the farm labourer to the life-long student; of divergent mental capacity, from the failure to the honours student; and of differing habits as to tobacco addiction. Their work was all checked for experience gained by a non-smoking prize student, who went through the entire series of experiments under similar conditions, his gains (or losses) modifying to that extent the percentage of the other men for the same tests.

It would seem from some of the results that habituation qualified the degree of mental inhibition resulting from smoking. The man who had the highest percentage decrease of efficiency was the one who used tobacco the least; likewise, the man who smoked fifteen to twenty cigarettes daily had less decrease than the one who smoked but two or three. On the other hand, the man who smokes about one cigar a month had far less reaction than the one who smokes three to ten pipefuls daily.

It being reasonably demonstrated that the smoking of tobacco is accompanied by a decrease of mental efficiency, there immediately arises the question as to the cause of this depression. An analysis was therefore made of all the tobaccos used, and also of the smoke of each tobacco.

Bush summarizes as follows: (1) A series of 120 tests on each of fifteen men, in several different psychic fields, shows that tobacco smoking produces a 10·5 per cent decrease in mental efficiency; (2) The greatest actual loss was in the field of imagery, 22 per cent; (3) The three greatest losses were in the fields of imagery, perception, and association; (4) The greatest loss, in these experiments, occurred with cigarettes; (5) Nicotine was found in the distillates of all tobaccos tested; (6) It was not found in the smoke of any tobacco, except that of cigarettes, and then only in traces; (7) Pyridin was found in the smoke of all tobaccos tested; (8) It seems to be the principal toxic factor in the smoke.

REFERENCES.—[1]*Wien. klin. Woch.* 1914, 497; [2]*Amer. Med.* 1914, i, 100; [3]*N.Y. Med. Jour.* 1914, i, 519.

TONGUE, CANCER OF. *K. W. Monsarrat, F.R.C.S.*

W. J. Mayo[1] says in regard to cancer in general, " I would again call attention to the fact that pre-existing lesions play the most important part of the known factors which surround the development of cancer ; that such precancerous lesions are produced by some habit or life condition which causes chronic irritation ; that where cancer in the human is frequent, a close study of the habits of civilized man as contrasted with primitive races and lower animals, where similar lesions are conspicuously rare, may be of value ; and finally, that the prophylaxis of cancer depends first on a change in those cancer-producing habits, and second on the early removal of all precancerous lesions and sources of chronic irritation." Ryall[2] develops the same theme in regard to cancer of the tongue. Syphilitic lesions of the tongue in particular render it vulnerable to chronic irritation. Tertiary lesions of the tongue do not occur in all syphilitics, but the proportion is high, although women are peculiarly exempt. There is a high percentage of syphilitics among subjects of tongue cancer and men who are not only smokers but heavy smokers. If tobacco were forbidden to all syphilitics, or at any rate to those who develop tongue lesions, cancer of the tongue would be a less common disease. Treatment may be considered preventive, radical, and palliative. Under the first, Ryall places the refusal of tobacco to syphilitics, and the careful and prolonged treatment of tongue syphilis under the check of Wassermann's reaction. In existing cancer he advocates removal of the whole tongue. The operation may be advantageously done in two stages : first, the removal of the lymphatic tissue from one side of the neck and the removal of the tongue itself ; later, the dissection of the opposite side of the neck. He emphasizes the necessity for clean dissection to avoid implantation in the wound.

Abbe[3] reviews his experience in cancer of the tongue and mouth during the past ten years. Although upholding the value of radium in selected cases, he considers that the patient's chief hope of cure lies in thorough surgery. In established cases of cancer the effect of radium is transient, but in papilloma and in giant-celled sarcoma (jaw) its action is specific. In most cases of cancer, even the most florid, radium will hold the process in check for a time, but the disease lights up again later. Abbe also dwells on the influence of tobacco. It is the great cause of leukoplakias and early cancerous lesions, either indirectly through the hot smoke on the mucous membrane or by the irritation of the mouthpiece, or directly by chewing.

Bloodgood[4] has a valuable article on the technique of operation. A point which he deduces from his study of cases operated on is that failure to remove the disease is due to neglect of thorough removal of the muscles of the floor of the mouth deep to the cancer. Further, a high mortality is due chiefly to removing the floor of the mouth without removing a portion of the lower jaw. In very early cases, removal of the local lesion with the electric cautery, together with a good margin of healthy tissue, is sufficient. He finds that in the past,

surgeons have removed too little of the tongue and performed too extensive operations on the glands of the neck. Cancer of the tongue infiltrates through the floor of the mouth into the neck, and if the glands of the neck are involved, adequate removal of the floor of the mouth is all the more necessary. When the operation is performed in one stage it is impossible to remove the tongue, the floor of the mouth and the glands, and then to close the opening in the mouth, unless a section of the lower jaw is also removed. If this operation is done thoroughly the mortality is very high—almost 80 per cent—from primary or secondary pneumonia or a late infection from the oral fistula.

He was first impressed by these facts when he found that the cases cured were those where it was necessary to remove portions of the jaw in order to get wide of the disease. In such cases the extent of the disease forced the surgeon to a radical procedure which involved the removal of the floor of the mouth *en bloc*. In earlier cases where less extensive operations were done, there was always local recurrence, and when an extensive operation was done without removing a portion of the jaw the patients died from the operation.

In a favourable and early cancer of the tongue the author deliberately removed the right half of the tongue, the right floor of the mouth, the right half of the lower jaw, and the glands on the right side of the neck in one piece. The wound was closed by suturing the mucous membrane of the cheek to the remaining half of the tongue. The patient swallowed immediately after the operation. The microscope showed that the floor of the mouth was infiltrated, the glands being free.

As this removal of the jaw is mutilating, Bloodgood attempted to obtain the same result in a different way. The glands of the neck were first removed, and the area of their connection with the floor of the mouth was thoroughly burned with the cautery ; the wound was then closed. At a second operation the lesion of the tongue and the floor of the mouth was eradicated with the electric cautery, this being repeated two or three times until everything was destroyed down to the area of cauterization at the first operation. He performed an operation after this plan in April, 1912, and this patient has no recurrence ; the lesion was situated between the tongue and the symphysis in the floor of the mouth. Four cases have subsequently been treated, with apparent success. Whether or not removal of the jaw is necessary will depend on the extent of the disease. Bloodgood's experience leads him to advocate operation in stages ; (1) Thorough removal of the glands, with cauterization of the floor of the mouth through the neck wound ; (2) Cauterization of the lesion within the mouth ; (3) Removal of the lower jaw and cauterized area.

In fourteen cases operated on during the last five years by these newer methods there was no operative mortality, and one patient only has died of recurrence of the disease. The general mortality in the hundred cases on which his study is based was 22 per cent, and

recurrences as a rule took place within a year of operation. The later results by new methods are much better than this.

In a discussion at the British Medical Association, 1914, Jamieson and Dobson[5] gave a demonstration of the lymphatic system of the tongue. They concluded that a block dissection was the only adequate operation for removal of glands; that the bilateral gland operation was indicated in growths of the tip and frænum, of the dorsal surface, of the lateral border if at all advanced toward the mid-line, and of the back of the tongue. Early growths of the lateral borders were those in which alone unilateral gland dissection was sufficient. The large lymphatic vessels were not permeated, the cancer reaching the glands by embolism. Though in early cases, particularly of growth of the lateral border, an intrabuccal operation would suffice for the local disease if care were taken to cut off the tongue close to the hyoid bone, it was clear that in later cases only an extrabuccal operation would do. As for dividing the entire procedure into two stages, a unilateral block dissection and intrabuccal excision of half the tongue might be performed at one sitting in early lateral growths. In patients in poor condition the gland dissection should be postponed ten days. In more advanced growths, and in all growths of the tip, frænum, or back of the tongue, a Syme's operation should first be performed, both sets of submental and submaxillary glands being removed at the same time. Ten to sixteen days later a block dissection of glands must be done, the internal jugular being left on one side. Alternatively the procedure might be carried out in three stages.

References.—[1]*Trans. Amer. Surg. Assoc.* 1914, Ap.; [2]*Brit. Med. Jour.* 1913, i, 697; [3]*Med. Rec.* 1914, i, 46; [4]*Trans. Amer. Surg. Assoc.* 1914, April; [5]*Brit. Med. Jour.* 1914, ii, 458.

TONGUE-CHEWING. *Frederick Langmead, M.D., F.R.C.P.*

Bernard Myers[1] records four cases of tongue-chewing. The patients were two brothers and one daughter of each. He concludes that the condition is first noticed about the second year of life, and persists until middle age, or perhaps throughout life. It tends to become less noticeable with advancing years. Either sex may suffer from it. It occurs apparently in healthy families in which certain members suffer from habit spasms. Several members of one family may be affected. The habit would appear to be inherited and not copied. The same side of the tongue is always chewed in the same individual. The mental condition is quite normal, and the general health is not interfered with in any way. Whilst bromides stop the chewing temporarily, it begins again in time, after the drug has been left off.

Reference.—[1]*Brit. Jour. Child. Dis.* 1914, 111.

TONGUE, PRIMARY TUBERCULOSIS OF. *F. W. Goyder, F.R.C.S.*

Trimble,[1] describing two cases of this condition, draws attention to its rarity and to the difficulty of diagnosis. It is more common in men than in women, and is usually found in middle life. The anterior half of the tongue is the part affected, generally near the tip; the

dorsum is usually free. The ulcers are as a rule very superficial; they may begin as a bleb, a fissure, or a nodule. The base is generally a dirty yellow, dotted here and there with minute whitish specks, which probably represent very small areas of caseation necrosis. The ulcer may be oval or gyrate, but the borders are usually sharply defined against the healthy tissue, sloping, and not undermined. The lesions are not indurated, and the neighbouring glands are very slightly affected. The condition is usually fatal in from six months to two and a half years. It is almost impossible to demonstrate the bacilli in the ulcer. Histological examination alone is useless as a means of diagnosing between syphilis and tuberculosis, but it is of great aid in excluding cancer. The majority of tuberculous ulcers of the tongue are secondary.

REFERENCE.—[1]*Jour. Cutan. Dis.* 1914, 199.

TONSILLITIS, EPIDEMIC. *E. W. Goodall, M.D.*

During the past year attention has been drawn to the prevalence in certain towns in England of an acute febrile disease, apparently infectious, and presenting a syndrome not hitherto described. The first account seems to have been that given in an anonymous paper,[1] entitled, "An Epidemic characterized by Adenitis, Tonsillitis, and Cardiac Complications." Then J. Gordon Sharp[2] recorded several cases under the heading "Epidemic Cervical Adenitis," and stated that the affection was prevalent in Leeds in the spring of 1913. Later, S. T. Pruen[3] and R. Kirkland[4] gave full accounts of a number of cases which they had seen in Cheltenham during the end of 1912 and the first few months of 1913. Their papers are headed "Epidemic Cervical Adenitis with Cardiac Complications." Pruen states that in one case the patient had just come from Sheffield, and in another from Hastings, while Kirkland quotes from a private letter from a physician in the south-west of England, who informed him that the disease had at about the same time been prevalent in that part of the country. In one of his cases the illness seemed to have been contracted in Woolwich. The disease was therefore somewhat widely spread.

Kirkland says, "The malady begins with malaise, sore-throat, pain and stiffness in the neck, sometimes on one side, sometimes on both; occasionally aching of the back and limbs. The glands of the neck are early affected. The first gland to be affected was usually that behind the posterior belly of the digastric muscle [the almost invariable enlargement of this gland is noticed also by Pruen], then the glands in front, beneath and behind the sternomastoid. The appearance of the neck in some cases resembled mumps, but in no case was the parotid involved. . . . In a few cases the swelling of the neck resembled bubonic plague, but never were the groin glands involved, always the neck. [Pruen saw one case in which the glands in each axilla were affected and in which there were reasons for believing that the tracheal and bronchial glands were also enlarged]. In three cases, suppuration of the glands occurred. The temperature

ranged from 99° in slight cases to 103° in severe cases, and on one occasion to 106·6°. The throat was in some red, glazy, and erysipelatous-looking ; in others it looked like follicular tonsillitis, while yet in others there was a membrane indistinguishable from that of diphtheria, except that it was perhaps whiter. The period of incubation seemed to be about four days. The disease affected all ages from two years upwards."

The heart complication sets in very insidiously, and may be overlooked if not frequently sought for. In about 10 per cent of the cases, according to Kirkland, murmurs, mitral or aortic, appear, and the heart becomes dilated. It has not been shown whether this lesion is an endocarditis, a myocarditis, or both. The severity of the illness is variable, as is also the duration. The acute stage lasts a week or two, but it is often several weeks before the patient is quite well. In a few cases the cardiac murmur persisted after recovery from the other symptoms. Rarely are other organs affected beyond those mentioned ; but Pruen saw one case in which there was orchitis ; in another there was a relapse in which the glands on the left side of the neck were affected, those on the right having been involved in the primary attack. Pruen records cases which go to show that the disease is directly infectious from one person to another. In an institution where there were 120 men, 22 were attacked in the first ten days.

Bacteriological examination of the fauces showed streptococci only ; in no case was the diphtheria bacillus found. In a few, streptococci were also obtained from the blood. In one of these the cocci were hæmolytic ; the case was a very severe one.

In two of Sharp's cases there were a transient erythema, one of them measly in character ; Kirkland met with one case in which there was an erysipelatous rash ; but rashes were uncommon in these outbreaks.

Some of the medical men in Cheltenham suspected that the disease was milk-borne. Kirkland briefly discusses the question. The evidence he gives is against milk infection ; but no thorough inquiry on this point seems to have been made.

A comparison of the symptoms of glandular fever with the malady under discussion makes it quite clear that they are not identical. The fauces are not inflamed in glandular fever. The Cheltenham outbreak recalls those of epidemic tonsillitis which occurred in Baltimore,[5] Chicago,[6] and Eastern Massachusetts[7] in 1911 and 1912 ; but in these outbreaks cardiac complications were not observed. The Chicago outbreak was due to the infection of milk with streptococci. A brief account of the American epidemics was given in the Medical Annual for 1913.

Treatment.—The most important point appears to be prolonged **Rest,** especially in the cardiac cases. Pruen treated two cases with an autogenous **Vaccine.** In one he had no doubt that the patient's life was saved.

References.—[1]*Brit. Med. Jour.* 1913, i, 1282 ; [2]*Ibid.* ii, 1280 ; [3]*Ibid.* 1914, i, 416 ; [4]*Ibid.* 1914 i, 419 ; [5]*Jour. Amer. Med. Assoc.* 1912, i, 1109 ; [6]*Ibid.* 1111 ; [7]*Boston Med. and Surg. Jour.* 1911, ii, 899.

TONSILS AND ADENOIDS.

J. S. Fraser, M.B., F.R.C.S.

Histology.—Wyatt Wingrave[1] has examined tonsils removed by enucleation, and noted the presence of muscle fibres, directly continuous with the pharyngeal constrictors. The fibres can be traced for some distance into the substance of the tonsil, carrying with them blood-vessels and a striking amount of elastic tissue. These elastic fibres divide into two distinct sets, one of which passes with the muscle fibres and vessels into the connective-tissue septa, the other along the buried surface of the tonsil, forming a definite band. In young subjects elastic tissue may be found under the stratified epithelium of the exposed surface of the tonsil. Wingrave suggests that these elastic fibres may play an important part in maintaining the position of the tonsil.

Function.—Henke[2] holds that the frequency with which the tonsils form the portal of entry for many general diseases has been much exaggerated. He does not believe that the tonsil absorbs from its epithelial surface, and holds that the lymph-current is in the opposite direction. Schœnemann regards the tonsils as submucous lymph-glands, and acute tonsillitis as due to infection reaching the tonsil from the area which it drains (the lower part of the nasal cavity). Clinical experience lends much support to this idea. Lenart and Henke have injected the nasal mucosa with solid particles in suspension, and have found that a direct lymphatic communication exists between nose and tonsils. A similar communication exists between the mucous membrane covering the alveolus of the upper jaw and the tonsil (Henke). These lymph-currents pass through the tonsil to its free surface and act as a powerful defensive mechanism. The function of the tonsils is therefore comparable with that of the ordinary lymph-glands, and, on account of their large free surface, they offer an exceptional opportunity for the excretion of foreign substances. It follows that tonsillitis, occurring alone or in association with rheumatism or endocarditis, is the result of lymphatic infection—the portal of entry being in most cases the nose, the accessory sinuses, or the mucous membrane of the mouth. When, as a result of marked pathological changes, the tonsil has come to resemble, as Hopmann says, a ' choked filter,' it is obvious that it should be regarded as a constant source of danger to the body as a whole.

Theisen[3] reports seven cases, in six of which *thyroiditis* occurred with, or directly after, an attack of tonsillitis. Two of the patients have since developed diffuse goitres. In all cases the thyroiditis occurred in previously healthy glands, and in none did suppuration take place. The patients were all girls or young women. The symptoms of acute thyroiditis are characteristic ; dysphagia is always present, and is due partly to pressure on the œsophagus and partly to the tonsillitis. The mucous membrane of the upper air-passages is always congested and swollen. Dyspnœa is another important symptom, and is due partly to compression of the trachea, caused by the enlarged thyroid, and partly to swelling of the mucous membrane.

Many cases start with fever, chill, headache, and prostration. Theisen treated his cases by an **Ice Coil** applied to the neck and by the internal administration of **Hexamine** (urotropine). The swelling of the thyroid usually subsided in a week or ten days.

Ingalls[4] states that research has proved that *B. tuberculosis* may pass through the tonsils and cause disease of the cervical lymph-glands, while the tonsils themselves may escape all injury. There is no direct connection between the cervical glands and the pulmonary lymphatics, and, for this reason, involvement of the lungs associated with cervical adenitis must be due to a systemic infection rather than disease of the lymphatics.

A Plea for Fewer Tonsil and Adenoid Operations.—Layton[5] believes that the faucial, pharyngeal, and lingual tonsils form an early and very important line of resistance to micro-organisms, which invade the body through the mouth and nose. When we find these organs enlarged, we must not at once infer that they are the cause of any surrounding inflammation. It may be that they are enlarged in consequence of it, so that our treatment must aim at removing the cause of inflammation rather than at removing the lymphoid tissue, the hypertrophy of which is only a result. In children the pharyngeal hypertrophy is more important that the faucial. Flat, fibrotic, faucial tonsils, with each crypt a bag of pus, are, however, a cause of repeated sore throats, and should be removed. Such tonsils, however, are not common in children. Before advising operation, Layton holds that we must eliminate two fallacies: (1) We must not come to a conclusion just after an acute attack; (2) We must remove any other source of septic infection. With regard to (1), Layton states that five years ago, when school children were being medically inspected, but before treatment had been organized, the throat department at Guy's Hospital was flooded with 'tonsil' cases, which had to wait from three to five months before operation. During this time their teeth were attended to and nasal-breathing exercises were taught. Time and again, when the children were admitted to hospital, Layton found that no operation was necessary. Layton further insists upon the importance of breathing exercises for two or three months after operation. The late Eustace Smith drew attention to the dyspepsia of the second dentition, and has named it 'mucous disease.' The symptoms of this complaint resemble those caused by adenoids, e.g., cough, and enlargement of lymphoid tissue. Layton holds that by treating this dyspepsia we may avoid the necessity for operation, with its attendant risks of hæmorrhage, choking, and death under the anæsthetic. In Layton's opinion we should find a greater number of instances of pneumonia after operation if cases were carefully followed up. He himself follows the rule laid down by Killian, never to operate if the child's temperature is above 99°, and in this way he avoids interfering with patients who are in the incubation stage of measles, scarlet fever, or diphtheria. Layton performs no operations on out-patients during the winter months. The complete removal of the tonsils does not

prevent further attacks of rheumatism, and Layton has had three cases of chorea which began after operations on the throat. On the whole, Layton agrees with Friedreich and Semon, who think that the pendulum has now swung too far in the direction of operation, and that cases are often sent to us for tonsillectomy to cure all sorts of diseases.

Guthrie[6] holds that **Enucleation of the Tonsil** is usually an easy operation. He uses the Sluder-Ballenger guillotine, except in adherent cases, in which he employs a blunt dissector and snare. Hett and Butterfield have found that the tonsils of healthy children had already begun to atrophy at the age of five years, and Guthrie agrees with those who hold that the lymphatic tissue of the tonsil is functional during early life. When the tonsils are diseased (chronic lacunar tonsillitis), or when they are subject to repeated acute inflammatory attacks, they should be removed by enucleation. Guthrie considers that true hypertrophy, on the other hand, is practically confined to children, and in this condition tonsillotomy may still be regarded as a satisfactory operation, though he acknowledges that some of these latter cases may require complete enucleation later on. By tonsillotomy, Guthrie understands removal of the whole tonsil, with the exception of the capsule, and a comparatively thin layer of tonsil tissue attached to it. He considers enucleation the more severe operation, requiring a longer anæsthesia, and entailing a greater risk of hæmorrhage and more discomfort after the operation.

Milne Dickie[7] gives a short account of operations on the tonsil as performed at the Royal Infirmary, Edinburgh. Up to 1908, tonsillotomy was performed. From 1908 to 1911 enucleation with vulsellum, scissors, and snare was carried out in selected cases. Since 1911, guillotine enucleation by the Sluder-Whillis-Pybus method has been employed. During these seven years, 7133 operations have been performed, with two deaths : (1) Girl, age 6, had a rapid pulse (194) after operation, and the breath had an odour of acetone. Vomiting was persistent, and the temperature rose to 102°. Post mortem, there were fatty changes in all organs. The probable cause of death was delayed anæsthetic poisoning. (2) A child, age 7, died two days after operation, probably from status lymphaticus.

There were 9 cases of serious hæmorrhage, and of these 4 followed tonsillotomy, 3 followed enucleation by dissection, and only 2 enucleation by the guillotine. The source of the bleeding in nearly all cases was from a vessel high up in the posterior pillar. Dickie states that there has been a very noticeable decrease in the amount of primary hæmorrhage since tonsillectomy was adopted. Septic complications included one case of bronchopneumonia, one of cervical adenitis, and one of retropharyngeal swelling. Acute suppurative otitis media followed operation in twelve instances—one of these led to a fatal meningitis. Acute articular rheumatism occurred in a patient who went to a theatre the day following operation, while several patients developed rashes indistinguishable from scarlet fever.

With regard to the question of injury to the soft palate, Dickie records the results in 60 cases who reported out of 200 guillotine enucleations which he had personally performed: 2 had damage to one posterior pillar; 5 had scarring, with slight pulling down of the palate; 29 had both pillars separate, with no scarring; the remainder had more or less fusion of the pillars. In several there was temporary nasal speech, but in none was this permanent. Dickie found that complete anatomical enucleation had been performed in 93 per cent of his cases. He holds that the disadvantage of tonsillotomy is that the submerged part of the upper pole is nearly always left behind, so that tonsillitis and peritonsillar abscess not uncommonly occur. In adults who have had repeated peritonsillar abscesses, guillotine enucleation is not always successful, as in these cases the tonsil is frequently fixed by adhesions to the superior constrictor. In such cases enucleation by dissection with scissors and snare should be employed.

Adenoids.—Wilson[8] has entirely relinquished the rapid operation under ethyl chloride, and has substituted a more painstaking method under chloroform and ether. The reason for this change was the failure of the more rapid method to cure Eustachian obstruction. Wilson points out that the two pillars of the Eustachian orifice separate during swallowing, and the lower border of the orifice is pushed up, the ostium assuming a triangular form. This result is due to the action of three muscles—the dilator tubæ (a portion of the tensor palati), levator palati, and salpingo-pharyngeus. In children suffering from deafness, associated with adenoids, the space behind the posterior lip of the Eustachian orifice is found to be more or less full of lymphoid tissue, which causes a mechanical obstruction to the opening of the Eustachian tube. For the removal of this lymphoid tissue, Wilson uses a small ring knife or Mackie's curette.

Wilson further notes the fact that many failures are due to neglect to remove enlarged posterior ends of the inferior turbinal. For dealing with these structures, Lake's guillotines may be employed, or the loop of a strong nasal snare may be adjusted over the posterior ends with the aid of a forefinger in the nasopharynx. Deviation of the nasal septum has often to be dealt with. In some of these cases the use of a dental splint may be sufficient to widen the palatal arch and nasal cavities.

Persistent cough after operation is often due to hypertrophy of the lingual tonsil. After-treatment is quite as important as the operation itself, and consists in (1) breathing exercises, (2) Politzeration, (3) the use of dental appliances. (*See also* MOUTH-BREATHING.)

Complications after Adenoid Operations.—Max Levy[9] states that hæmorrhage is the most common complication after adenoid operations. This may only be recognized when the stomach becomes full and the blood is vomited. The best practice is to scrape the nasopharynx again, as the hæmorrhage is usually due to a semi detached piece. Post-nasal packing should be avoided. Injury to

the Eustachian cushion and the soft palate is also mentioned—the latter may cause nasal tone of voice. Fever occurs after operation in 40 per cent of cases, but infection of the neighbouring lymph-glands is rare. Stiffness of the neck and torticollis are due to myositis of the prevertebral muscles. Acute otitis media occurs, as a rule, in cases in which the ear was already the seat of chronic inflammation before the operation. Levy says that if we regard scarlet fever merely as a special form of sepsis, it is not remarkable that it should occur after operations on the tonsils and adenoids. It is very difficult to diagnose scarlatina from the septic rashes which sometimes follow operation—if there really is any difference! Pyæmia and septicæmia with exophthalmos may follow the removal of adenoids, the infection passing from the pharyngeal plexus to the facial and ophthalmic veins. In all cases the surgeon should make sure before operation that there has been no recent case of illness in the house.

REFERENCES.—[1]*Jour. Laryngol.* 1914, 181; [2]*Arch. f. Laryngol.* xxviii, 2; [3]*Ann. Otol.* 1914, Mar.; [4]*Jour. Amer. Med. Assoc.* 1913, July 12; [5]*Lancet*, 1914, i, 1106; [6]*Liverp. Med.-Chir. Jour.* 1914, 144; [7]*Jour. Laryngol.* 1914, 184; [8]*Lancet*, 1913, ii, 1612; [9]*Zeits. f. Laryngol.* v. Heft 8.

TRACHEOTOMY. *J. S. Fraser, M.B., F.R.C.S.*

Franck[1] holds that *transverse incision* of the skin and trachea is easier and quicker. The tracheal wound gapes and allows of easy introduction of the tube. The cosmetic result is better, and the danger of complications is reduced. The technique is as follows: After transverse incision of the skin, the muscles are separated along the linea alba, and the isthmus of the thyroid is displaced downwards with the left forefinger. Then, without employing any special means of fixation, the trachea is incised horizontally directly beneath, and as close as possible to, the lower border of the cricoid. The wound gapes, and the tube can be gently slid into position.

Biernacki[2] believes that many deaths attributed to lobular pneumonia complicating diphtheria are really due to suffocation caused by a plug of desiccated mucus situated in the neighbourhood of the tracheal bifurcation. This is proved by the immediate relief which follows removal of the plug. A sand-bag is placed beneath the patient's shoulders, and over this the head is extended. To remove the plug Biernacki uses forceps with a bulbous point, which he inserts closed, and opens as the tracheal bifurcation is approached; the forceps are then advanced a little, closed, and withdrawn. This operation may have to be repeated on several occasions.

Biernacki holds that it is safer to place every tracheotomy case in steam for at least a week. In some cases he obtains benefit from an intratracheal spray of **Sodium Bicarbonate** (10 gr. to the ounce of water). The efficacy of this treatment depends on the expertness of the nurse, who should compress the bulb of the spray during successive inspirations and swab up the expectorated fluid with cotton-wool held in sinus forceps.

REFERENCES.—[1]*Münch. med. Woch.* 1914, No. 17; [2]*Lancet*, 1914, ii, 89.

TRICHINOSIS. *Herbert French, M.D., F.R.C.P.*

Van Cott and Lintz[1] and Sicard[2] describe several recent cases of trichinosis occurring in America. After trying various other remedial measures without success, they hoped that they might be able to combat the disease by the injection of strong preparations of arsenic, and to this end they employed both salvarsan and neosalvarsan. They found, however, that neither of these exerted any beneficial influence over the infection.

In one of their cases they record the detection of the trichina parasites directly in the cerebrospinal fluid obtained by lumbar puncture. This is probably the first case on record where this has been done. They confirm the occurrence of marked eosinophilia in the disease.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 680; [2]*Med. Rec.* 1914, ii, 282.

TRIGGER FINGER. (*See* Hand, Surgical Affections of the.)

TRYPANOSOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P.*

In 1912 Kinghorn and Yorke showed that game in Rhodesia harboured the trypanosome which causes sleeping sickness in man. Shortly after, Bruce and his fellow-workers confirmed this, and showed that *T. brucei* of cattle is probably identical with *T. rhodesiense* of sleeping sickness. Subsequently German workers, especially Kleine, opposed this view. W. Yorke and B. Blacklock[1] discuss Kleine's objections, and hold that his failure to infect himself with rhodesiense-like trypanosomes from game only proves that a single healthy individual was able to resist infection. They think that it is exceptional for human beings to be susceptible to the disease, as otherwise it would not be possible to account for the cases of sleeping sickness in Nyassaland and Northern Rhodesia being so few and scattered when the game is so extensively infected. The human trypanosomes have repeatedly been successfully inoculated into game, and are identical in their morphology, pathogenicity for laboratory animals, and their development in *Glossina morsitans*, with those found in game. H. L. Duke[2] deals with the same subject at length, and is in entire agreement with the above. The Commission showed that the human trypanosome has been recovered from inoculated antelopes up to twenty-two months after infection, while the animals remain in good health, and appear to be capable of keeping up a reservoir of infection indefinitely, and to be responsible for the continued infectiveness of the north shore of the Victoria Nyanza lake several years after the human population had been removed. G. Prentice[3] states that when rinderpest killed off most of the big game in Rhodesia and Nyassaland the tsetse fly nearly disappeared; but since that time the fly has enormously increased with the multiplication of the game, which is protected by Government, with the result that sleeping sickness is spreading extensively. The European population are forbidden to protect themselves against this deadly disease by killing off the game in the neighbourhood of their habitations, owing to "the fads and mistakes of people at home."

J. W. C. Macfie[4] deals with the pathogenicity of a trypanosome obtained from a case of sleeping sickness in Southern Nigeria, which he thinks is a new species, and proposes to call *T. nigeriense*. He found it to be less virulent than Yorke's strain for most laboratory animals, and states that it differs from all other strains in its slight degree of pathogenicity for rats and dogs. The same worker in conjunction with J. E. L. Johnston[5] found phagocytosis of the red corpuscles a marked feature of trypanosomiasis, and suggests it may have some diagnostic import, although it also occurs in other protozoal diseases.

TREATMENT.—Chatard and Guthrie[6] record the second case of trypanosomiasis observed in America at Baltimore in a Belgian, who had contracted the disease in the Congo district. He had been treated with atoxyl without effect. The symptoms disappeared under the use of **Antimonial** compounds, the patient remained free for two years, but relapsed, and was last reported to be dying of the disease in a Belgian hospital. Johnston[7] and Macfie[8] have tried the effects of iodine, bromine, and osmic acid on animals infected with trypanosomes, but found them more dangerous to the animals than to the parasites. Having observed the disappearance of *T. lewisi* from the blood of a rat infected with staphylococci, they tried a vaccine of this organism, but without good results, although leucocytosis was produced. Yorke and Blacklock[9] have tested the effect of antimony trioxide. They found it was precipitated in the muscles on injection, and only small proportions were absorbed. In large animals, such as donkeys, it almost always caused sterile abscesses. Intravenously it was precipitated in the vein, but was harmless intraperitoneally. In small animals 1 mgram per 10 grams of weight was borne, but only smaller proportions in large animals. The parasites often disappeared from the blood, but relapses took place up to over two hundred days later. The drug had a prophylactic action against *T. rhodesiense*, but not against *T. gambiense*. The same writers[10] tested the effect of a so-called serum prepared by Mr. H. C. Sieg, who refused to state its composition, and they found it to be quite valueless. A. Kopke[11] has treated a number of cases of human trypanosomiasis with salvarsan and neosalvarsan without obtaining favourable results.

T. S. Kerr[12] records the case of a lady infected with trypanosomiasis and treated with 1- to 3-gr. doses of **Soamin** intramuscularly every fourth day, and **Sodium Antimony Tartrate** in doses of from ½ to 2 gr. daily, mixed with her food or diluted in half a pint of water. Later, **Tartar Emetic** was injected intravenously (½ gr. in 6 oz. of saline every third day up to seven doses). Animals have since been several times injected with her blood, but none of them became infected. She maintained good health throughout, and is quite active two years after the commencement of the disease. W. Kolle, O. Hartoch, and W. Schurmann[13] have employed **Antimony Trioxide** (**'Trixidin'**) in trypanosome infections. They found the organisms could be completely destroyed in large animals with chronic infections. When large abscesses stopped the treatment, intravenous injections of solutions

were successful. In dogs suffering from dourine, combinations of antimony were successfully used by inunction, especially dimethyl-phenyl-pyrazolon-antimon-trichloride ointment. The inunction treatment is applicable to man. A colloidal form of antimony trioxide has been given intravenously in small animals, and is being further studied. Hellen[14] has also studied trixidin. In 24 out of 28 subcutaneous injections, high fever and abscess-formation requiring operation ensued. This makes the drug unsuitable for employment in sleeping sickness.

C. Schilling[15] has studied the methods carried out in Uganda to eradicate sleeping sickness, and reports that these, and especially clearing undergrowth near the lake, have distinctly diminished the disease.

Curative action claimed for **Galyl** and **Sudyl** (*p.* 2).

REFERENCES.—[1]*Brit. Med. Jour.* 1914, i, 1234; [2]*Ibid.* 289; [3]*Ibid.* 193; [4]*Ann. Trop. Med. and Hyg.* 1914, 29; [5]*Jour. London School Trop. Med.* 1913, 212; [6]*Amer. Jour. Trop. Med.* 1914, 493; [7]*Jour. London School Trop. Med.* 1913, 207; [8]*Ann. Trop. Med. and Hyg.* 1914, 55; [9]*Ibid.* 51; [10]*Ibid.*; [11]*Jour. Trop. Med.* 1913, 303; [12]*Ibid.* 1914, 81; [13]*Deut. med. Woch.* 1914, 212; [14]*Ibid.* 388; [15]*Ibid.* 1913, 2094.

TUBERCULOSIS IN CHILDREN. *Frederick Langmead, M.D., F.R.C.P.*

Much difference of opinion exists as to the importance of the part played by the *Bacillus tuberculosis bovum* in the tuberculosis of children. The careful work of A. P. Mitchell[1] at Edinburgh indicates that, in Scotland at any rate, bovine tuberculosis is very prevalent in children. He investigated 72 consecutive cases of tuberculous cervical glands removed by operation; 38 of the patients resided in Edinburgh and 34 in the neighbouring country districts within a radius of thirty miles. Guinea-pigs were inoculated with the tuberculous material, and cultures were made from the lesions which developed. The human and bovine bacilli were distinguished by their cultural characteristics and by the degree of virulence they exhibited when inoculated into rabbits. No difficulty was found in differentiating between cultures of the two organisms, and the test in the rabbit was shown to be very reliable, the bovine bacillus being much more virulent to that animal. The bovine bacillus proved to be the infecting organism in 90 per cent of the cases; in only 10 per cent was the human bacillus the cause. In 25 out of 27 children under three years, the infection was of the bovine type, The importance of this observation is seen when it is taken in conjunction with the fact that 84 per cent of the children under two years of age had been fed on unsterilized cow's milk since birth. There was a history of pulmonary tuberculosis in the family in only three instances, and in each of these the human variety of tubercle bacilli was isolated from the cervical glands. Fifty per cent of the children from whom the bovine bacillus was obtained had been born and brought up in the rural districts around Edinburgh; this is attributed by the author to the imperfect state of veterinary inspection in that area. He mentions several instances where the

source of the milk on which the infected child had been fed was inquired into and shown to have been derived from a tuberculous cow. From the order in which the glands in the neck were infected, he concludes that the mouth and nasopharynx, and especially the tonsils, were the avenues of infection. This is supported by the fact that the faucial tonsils were tuberculous in 37·5 per cent of 64 consecutive cases of children suffering from tuberculosis of the upper deep cervical glands. Mitchell also investigated the hypertrophied tonsils removed from 90 children in whom the cervical glands showed no clinical evidence of tuberculous disease ; 6 of these tonsils were seen to be tuberculous histologically, while 9 yielded positive results when inoculated into guinea-pigs. The bovine bacillus was present in 3 cases and the human in 1. The practical lesson to be learnt from this work is that an efficient public control of the milk supply is essential. Until this has been obtained, Mitchell strongly advocates that all milk supplied to children should be sterilized.

H. T. Ashby[2] holds similar views as to the frequency of infection by tuberculous milk and, like Mitchell, insists on its sterilization. It is interesting to remember in this regard, as Ashby points out, that England is almost the only country in the civilised world where children are habitually fed on raw milk. Lane-Claypon showed some few years ago, after statistical investigation, that boiled milk was, if anything, a more valuable food than raw milk ; and, more recently, that the ferments found in raw milk, and regarded by Escherich as of great physiological importance, are not present if the milk is pure, but are formed from bacteria in contaminated milk, and are actually destroyed in the intestines.

Diagnosis.—The diagnosis of tuberculosis in children, especially in its early stages, is often a matter of very great difficulty. At its beginning it is essentially a disease of the lymphatic tissue, and when the affected glands are deeply seated, as at the roots of the lungs, a definite diagnosis is often impossible. When convincing signs are detected over the lungs, the disease has already made a distinct advance ; whilst, on the other hand, such signs as would lead to the diagnosis of phthisis in adults have more often quite other significance when discovered in children. Sputum is usually unobtainable. The tuberculin tests, from which much was hoped, often prove useless in the diagnosis of a particular case, however valuable they may be as a means of estimating the incidence of tuberculosis in children. The diagnosis in early cases, therefore, can only be made by taking all available data into consideration, and by repeated examination.

Ashby writes of the diagnostic value of a family history of tuberculosis or a history of exposure to the infection, and of such general symptoms as poor appetite, tiredness, an irregular and prolonged rise of temperature, and wasting. As he says, sweating is such a common symptom in children that it has not the same significance as in adults, whilst hæmoptysis is very rare. He places little reliance on the von Pirquet test. J. B. Hawes,[3] on the other

hand, whilst agreeing that all the evidence should be carefully weighed in each case, lays most stress on the cutaneous tuberculin reaction. He states that in the absence of advanced tuberculosis, or of a recent secondary infection, a diagnosis of tuberculosis is rarely justified unless there is a positive cutaneous tuberculin reaction. If constitutional symptoms are absent, a definite diagnosis is unwise, although this should not interfere with placing the child under proper treatment. Local signs are of interest and value, but their absence should not preclude a definite diagnosis. If they are present without constitutional symptoms, one should be on the *qui vive* for chronic influenzal and pneumococcal infections. Positive *x*-ray evidence he considers of value in conjunction with other data, but diagnoses based on radiograms alone are apt to be wrong and unjust to the patient.

E. Bellingham Smith,[4] dealing with the two symptoms chronic cough and wasting, points out that in at least 90 per cent of cases they are due to intestinal derangement alone. In his opinion, by far the most common form of intrathoracic tuberculosis in children consists in tuberculosis of the bronchial or mediastinal glands, with invasion of the lungs later. In these cases the cough is paroxysmal in type, and accompanied by one or more of the following signs: dullness about the manubrium sterni; distention of the veins of the neck, of the upper part of the chest, and of the shoulder region; a venous hum at the junction of the clavicle and manubrium, increased by extending, and decreased by flexing, the head; a pulmonary systolic murmur; signs of pressure on a bronchus, usually the right; in more advanced cases, stridor, increased by extending the head; and hoarseness of voice if the nerves are involved. To this may be added the sign described by d'Espine. It consists in the transmission of the whispered voice and of breath sounds to the back at a lower level than is usual in normal children. Its value cannot yet be said to have been proved.

Scrofula.—C. McNeil[5] revives the old term 'scrofula,' and applies it to a definite clinical condition, a disease of childhood, declaring itself most frequently from the third to the fifteenth year. It manifests itself in one, several, or all of the following characters: glandular swellings in the neck; obstinate and relapsing catarrhs of the eyes, nose, throat, lungs, intestines, and weeping eczema of the skin and scalp; tuberculous disease of the bones and joints; and peculiar (usually lichenous) eruptions of the skin. There is generally a definite configuration or habit of the body, characterized by arrest of growth of the trunk, producing a relatively large appearance of the head; a fair amount of superficial fat; and overgrowth of the hair, as seen in the thickly pencilled eyebrows, the long lashes, and the increase of the downy hair on the general surface, but especially on the cheeks and between the shoulder-blades. Two cases illustrating the condition are shown in *Plate LIX. Fig. A* is a boy, age 6, with classical scrofula. Note the facies and general configuration of scrofula in the relatively

large head, stunted and wasted body, large mass of tuberculous cervical glands, dark eyebrows, thickened upper lip. Note also the protuberant abdomen, likewise the seat of tuberculous disease. *Fig. B* exhibits the right profile of the same boy, showing well the unusual thickening of the upper lip (snout-like), the deeply indrawn cicatrices in the neck, deeply pencilled eyebrows, long eyelashes, and overgrowth of fine hair in the parotid region. *Fig. C* shows a case of scrofulodermia in a girl, age $2\frac{1}{4}$ years. Note the intense cutaneous reactions to human and bovine tuberculin, producing two extensive vesicles with central eschars. Note also the legs covered with livid depressed patches, the ulcers at the bases of the toes, the blepharitis, especially of the left eye, the sores on the lips and on the cheeks—all being tuberculides of unusually severe type. In the great majority of cases tuberculous infection is actually present in the glands, bones, and joints, and also as tuberculides in the skin. The tuberculous process is unusually active, and generally ends in caseous or suppurative change. Scrofulous patients seldom develop phthisis in later life, nor do they become the subjects of generalized tuberculosis in childhood; they may be described as harbouring local and self-limited tuberculosis. Tubercle bacilli are rarely found in the secretions. A few cases of well-marked scrofula appear to be non-tuberculous. The peculiar features which infective processes assume in the subjects of scrofula are ascribed to an underlying abnormal constitutional state, variously named by different authors—inflammatory diathesis (Virchow), lymphatic temperament (Villemin), status lymphaticus (Escherich), exudative diathesis (Czerny). This constitutional state may be congenital or acquired, and is usually temporary.

Escherich has shown that scrofulous children are hypersensitive to tuberculin, and McNeil obtained intense cutaneous tuberculin reactions in a boy's school where it appeared that an unusual amount of scrofula was present. A fulminant form of pneumonia was also present, and post-mortem examination of fatal cases revealed the signs of status lymphaticus. The conclusion that McNeil draws is that the underlying state which produces scrofula is identical with what is usually known as status lymphaticus.

Treatment.—Little has been added to the generally accepted and well-known methods of treating tuberculosis in children. All treatment is likely to be unavailing if the child remains at, or returns to, an infected home. Ashby holds that cases of phthisis do not progress so favourably in exposed windy places, such as on the sea-front of a watering-place, as in more sheltered places slightly inland. He dislikes the use of gas fires in the bedroom, because they dry the air and do not help to ventilate the room. **Belladonna** he regards as a very useful remedy, especially if there is much bronchitis, for it not only eases the cough but stimulates the heart.

In the treatment of anæmic and tuberculous children E. A. Locke[6] has applied to the principle of **Dieting** according to the caloric value of the foods. He acknowledges the difficulty in defining a strict standard

PLATE LIX.

'SCROFULA' IN CHILDREN

Fig. A.

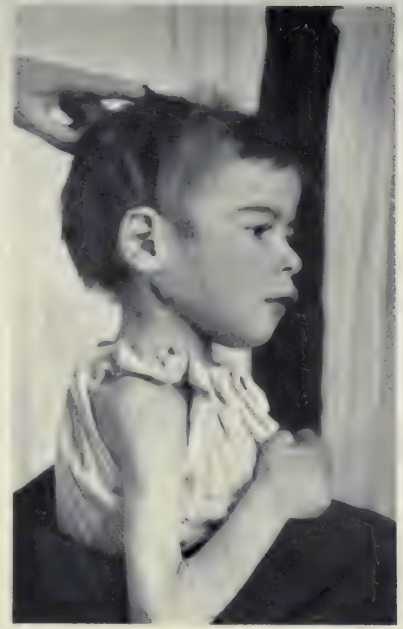

Fig. B.

Fig. C.

Kindly lent by Dr. Charles McNeil

of dietary along these lines. He arranged the diet almost entirely according to the size of the patient, finding that the age was of little significance, because of the great variation in weight and development. An important guide was the weight curve, which should follow a steady upward course. Gastro-intestinal symptoms should always be looked for, as they are likely to be the earliest signs indicating over-feeding, and whenever possible the stools should be examined at regular intervals as a routine measure.

REFERENCES.—[1]*Brit. Med. Jour.* 1914, i, 125; [2]*Med. Chron.* 1914, 425; [3]*Boston Med. and Surg. Jour.* 1914, i, 784; [4]*Clin. Jour.* 1913, 437; [5]*Edin. Med. Jour.* 1914, i, 324; [6]*Boston Med. and Surg. Jour.* 1913, ii, 701.

TUBERCULOSIS, GENERALIZED. (*See also* ERYTHEMA NODOSUM.)

Herbert French, M.D., F.R.C.P.

Landouzy described a condition which he called 'typhobacillosis.' Briefly expressed, this consists of a fatal general tuberculosis without any definite tubercles being visible in the viscera post mortem; in other words, a tubercle-bacillus septicæmia producing death before there has been time for individual miliary tubercles to grow to a visible size. That such a condition may exist seems to be confirmed by the case recorded in detail by Krokiewicz.[1] The diagnosis was established by the recovery of tubercle bacilli both from the blood and from the cerebrospinal fluid during life, their tuberculous nature being confirmed by animal inoculation, yet post mortem there were none of the ordinary visible lesions of general tuberculosis. This condition may not be so very rare as might be supposed from the number of recorded cases. The difficulty is to establish the diagnosis, because no pathological micro-organisms may be found by ordinary cultural methods. If, however, the possibility of acute tuberculous septicæmia without microscopic lesions is borne in mind, the nature of occasional very obscure cases of fatal septicæmia may be explained.

REFERENCE.—[1]*Rev. de Méd.* 1914, 369.

TUBERCULOSIS, GENITAL. *J. W. Thomson Walker, M.B., F.R.C.S.*

Cabot and Barney[1] state the *clinical pathology* of genital tuberculosis as follows: The disease is primary in the epididymis, occasionally in the testicle, rarely in the prostate. The prostate is involved secondarily early in the disease, and ultimately in a vast majority of cases. The organs which are primarily involved show very little tendency to healing of the disease, while those which are affected secondarily show a far greater power in this direction, and heal under favourable conditions. The authors regard epididymectomy with removal of the accessible portion of the vas as the best operation. The secondary foci in the testicle may be dealt with locally, and the secondary process in the prostate should be left to nature. After performing epididymectomy, the authors advise that the vas deferens be clamped and cut off. The clamp on the attached end of the vas is passed up to the external abdominal ring along the inguinal canal until the tip lies beneath the fascia at the base of the internal abdo-

minal ring and the point is projected against the skin. A half-inch incision is made on the clamp, which is pushed out, carrying the distal end of the vas. Traction is made on the vas, which is freed by the finger inserted into the wound, and it is clamped, cauterized with pure carbolic acid, and dropped back.

Lyons holds that primary tuberculosis of the prostate and seminal vesicles in children is rare, and is with a few exceptions secondary to lesions of the kidney or epididymis. Tuberculosis of the testis occurs most frequently between the ages of twenty and forty, during the greatest activity of these organs, when they are most liable to injury and infection. In 93 cases collected from various authors, 44 were under two and 47 over twelve years of age. The imperfectly descended testicle is said to be predisposed to tuberculosis, but in practice, tuberculosis of the imperfectly descended testis is very rare.

In discussing the operative treatment of tuberculous epididymitis, L. E. Schmidt[2] did not consider removal of the vas deferens necessary unless nodules could be felt along its course. Only a short portion of the vas was removed, and the lumen was injected with pure carbolic acid and tied off. When the seminal vesicles and prostate were involved, extensive operation used to be performed for their removal, but the idea now was to leave them, as improvement followed the removal of the epididymis.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1913, ii, 2056; [2]*Ibid.* 2058.

TUBERCULOSIS, PULMONARY. (*See also* BRONCHIAL GLANDS, TUBERCULOSIS OF; SPUTUM, EXAMINATION OF; BLOOD, CLINICAL PATHOLOGY OF.) *J. J. Perkins, M.B., F.R.C.P.*

DIAGNOSIS.—The puzzling occurrence of *extrapulmonary adventitious sounds* has been investigated by Hawes[1] in the study of 250 patients. These signs, which may very closely imitate the ordinary crepitations of phthisis, he divides into: (1) Muscle sounds; (2) Joint sounds; (3) Bursal sounds; and (4) Atelectatic râles. Of these the second is much the most important. Sounds closely resembling râles, and due to this source, were present in 22 per cent of the cases. These joint sounds are produced over the upper thoracic surface by the movement of the arm at the shoulder joint, and particularly by raising or lowering the arm. They are loud enough to be distinctly heard over the apices, and may easily be a source of confusion. Hawes finds the best way to avoid error is to make the patient hold the nose tightly and shut the mouth, so that no air can get into or out of the chest, and then go through the motion of taking a full breath without taking one: if the shower of crackles still continues, it is conclusive proof that they are not produced in the lung. Muscle sounds may not only take the form of a low-pitched rumble, but on occasion may closely resemble a shower of dry crackles. They particularly occur in muscular patients of nervous temperament, and may easily be a source of error. The difficulty is best met by calming the patient, and seeing that the room is well warmed. The atelectatic

râles are the sounds so frequently heard at the bases on deep breathing, due to the opening of pulmonary alveoli previously unused. Their nature is known by the fact that they disappear after a few deep respirations.

The *percutaneous tuberculin reaction* obtained by the inunction of Moro's ointment has been studied by Bruce Leckie[2] in 400 cases. His conclusions are on the whole unfavourable, and he looks upon it as less reliable than the von Pirquet test ; in fact, he describes it as exceedingly inaccurate and of no value in prognosis. For example, 34 out of 43 cases of pulmonary tuberculosis failed to respond, and in osseous tuberculosis, in which Moro claims particular accuracy, only half reacted, while the majority of cases of tuberculous peritonitis also failed. Musser[3] speaks much more favourably of the value of the test. Of 24 cases in the first two grades of pulmonary tuberculosis, all reacted positively, though in 10 cases of far advanced pulmonary disease, 9 failed to react.

Leckie's opinion of the von Pirquet reaction is almost equally unfavourable, and he allows it little value. Results, he finds, are more frequently obtained in women and children than in men, due possibly to the greater delicacy of the skin ; and he actually found cases of rheumatism gave more positive results than tuberculous individuals.

Prognosis.—The difficulty of arriving at a prognosis in cases of acute pulmonary tuberculosis, and of estimating the severity of the lesion, is a problem on which Hyslop Thomson[4] finds the *diazo-reaction* of the urine throw a good deal of light. The type of case, he says, in which the reaction is present is characterized by an acute progressive lesion ; it is almost invariably present in the type of acute case which in the past was so frequently mistaken for enteric fever. Its persistence or subsequent disappearance is of great value in estimating the possibilities of improvement in an acute case ; generally the persistence of this reaction is a sign of serious significance.

Three solutions are required for the test : (1) A saturated solution of sulphanilic acid ; (2) A saturated solution of sodium nitrite ; (3) A diluted solution of sodium nitrite made by adding 5 min. of No. 2 to 2 oz. of water. The method is as follows : Pour 3 dr. of (1) into a test tube, then add 10 min. of hydrochloric acid and 7 min. of No. 3. Add an equal quantity of urine and shake ; then pour in gently 20 min. of strong ammonia. If the reaction is positive, a rose-red ring forms, and when the tube is well shaken the rose colour spreads throughout the liquid and appears in the froth. The quantities of the solutions must be measured accurately, the saturated solution changed frequently and kept in the dark, and solution No. 3 must be made fresh each time.

Out of 500 cases of pulmonary tuberculosis, 27 yielded a positive diazo-reaction, of whom 18 were dead, 6 dying or hopelessly ill at the time of inquiry, and 3 fairly well. The absence of the reaction must not, however, be regarded as a favourable sign unless it is known to

have disappeared after a period of persistence. On the other hand, its sudden appearance is a sign of serious import. The disappearance of the sign in acute cases while under treatment, is associated with marked improvement in the general condition, while improvement without the disappearance of the reaction is usually temporary. In Thomson's experience no case with a well marked diazo-reaction should be treated otherwise than by rest, exercise and the use of tuberculin being contra-indicated as long as the reaction persists. Its presence is usually associated with a positive Russo's reaction, in which, on adding 2 or 3 drops of 1–1000 solution of methylene blue to a small quantity of urine, the colour changes from peacock blue to emerald green. The presence of the two reactions forms a ground for a very grave prognosis. In those cases, however, in which a positive diazo-reaction is associated with a negative Russo reaction, the outlook is less unfavourable, and some improvement may follow.

TREATMENT.—Barnes,[5] reporting 120 cases treated with **Friedmann's Tuberculin,** has not formed a favourable opinion of the remedy. Speaking generally, the cough and expectoration did not strikingly improve ; the vaccinated patients lost more weight than others, had more fever and night sweats after the vaccine than before, while blood-spitting was at least as frequent. The bacilli persisted in the sputum in 85 per cent of positive cases. On the other hand, some 20 per cent experienced a certain amelioration of symptoms. There was but one case with striking improvement, a young man with arthritis of the elbow recovering to a considerable degree.

Cuno[6] speaks well of **Rosenbach's Tuberculin,** which he used in the case of thirty children, but three of whom were suffering from pulmonary tuberculosis ; good results were seen in tuberculous disease of the joints, glands, and bone, while in peritoneal tuberculosis the results were strikingly good, the temperature dropping from quite a high range to normal, and fluid disappearing. Making all allowance for the tendency of tuberculosis in childhood to heal, Cuno considers the tuberculin a powerful auxiliary factor in these cases, of whom 21 did well, 4 improved, and in 5 only was there no change. Rosenbach's tuberculin was used by Mayer[7] in the treatment of 31 cases of pulmonary tuberculosis, 11 of whom were in the first stage, 11 in the second stage, and 9 in the third stage, on Turban's classification. The system of small dosage was followed, but small reactions were not avoided, as they seemed to influence fever beneficially. Of course other means of treatment were employed at the same time, but the results of the tuberculin were considered to be good, the general condition was improved, and the effect on the lung was remarkable. A favourable effect on fever was one of the most striking features. Mayer considers the toxicity of this form of tuberculin to be slight, while it is well borne ; in but one case did signs of hypersensitiveness develop.

Halliday Sutherland[8] attempts to meet the somewhat disappointing results which occur with tuberculin by using a polyvalent solution, on the supposition that any tuberculin employed may not sufficiently approximate in its chemical constitution to the tuberculous toxins in the patient's system. The **Polyvalent Tuberculin** he employs has the following constitution for each c.c.: Tuberculin (Koch), 0·025; bovine T., 0·025; vacuum T., 0·025; bovine vacuum T., 0·025; T.R., 0·05; bovine T.R., 0·05; bacillary emulsion, 0·033; bovine bacillary emulsion, 0·033; polygenous bacillary emulsion, 0·034; T.O.A., 0·35; and P.T.O., 0·35. A mechanical dose is impossible, since the optimum dose will depend on the patient's condition. The most important of the reactions to tuberculin is the temperature reaction, and Sutherland describes six forms of reaction, each having its own appropriate bearing. Under a reaction it must be noted that he includes even 0·5° rise above the mean, occurring within seventy-two hours of the injection.

The forms of reaction are classified by him into:

1. Immediate, i.e. reaching its maximum within twenty-four hours.
2. Delayed, reaching its maximum within forty-eight hours; and
3. Progressive, reaching its maximum within seventy-two hours of injection.

Any of these forms may resolve by crisis or by lysis, giving six types in all; the fall by crisis indicates a complete immunizing response, by lysis an incomplete immunizing response:

1. An immediate reaction with fall by crisis; the mildest form of reaction, needing no diminution of the dose; (1*a*) An immediate reaction with fall by lysis: the dose should be reduced by one-fifth.

2. A delayed reaction, with fall by crisis; the dose may be repeated at next injection; the delayed reaction indicates a delayed absorption of the tuberculin; (2*a*) Delayed reaction with fall by lysis: reduce dose by one half.

3. Progressive reaction with fall by crisis: reduce the dose to one-tenth; the progressive reaction indicates toxæmia from a focal reaction; (3*a*) Progressive reaction with fall by lysis, i.e., a focal reaction not overcome by immunization: stop the tuberculin treatment.

Warren Crowe[9] proposes to solve the problem of the dosage of tuberculin by observation of the weight of the patient. Clinical observation, on which many rely for a decision of the size of the dose and the length of the interval, is not entirely satisfactory, and the opsonic index requires such frequent repetition as to be outside the range of practical treatment for the majority. Crowe has noticed that the weight of patients taken daily at the same hour shows remarkable fluctuations, which, on plotting out a curve, he found to bear a distinct resemblance to the immunity curve as shown by the opsonic index taken at the same time as the weight. The daily weight curve, then, may take the place of an immunity curve, and give at once a simple and accurate method for the regulation of the dosage of tuberculin. The method pursued is as follows: The daily weight is taken

for a few days before the first dose, which should be small; and whatever the weight curves may be, the interval between the doses should never be more than five days until high doses are employed. The weight curve will indicate the negative phases and determine the advisability of the increase or diminution of the dose.

Whelan[10] advocates the combination of **Tuberculin** with **Strychnine,** the former being given weekly, and the latter daily by intramuscular injection of large doses. He has given the strychnine in this way in all classes of phthisis with invariably good results, the appetite and digestion being greatly improved. These results, however, can only be obtained by intramuscular or subcutaneous injection, and not by administration by the mouth. He uses a solution of liquor strych. hydrochlorid. 100 min. made up to 400 min. with sterile normal saline solution made with camphor water. The dose is 18 to 25 min. In febrile, hæmorrhagic, and third-stage cases, in which tuberculin injections are considered inadmissible, he has found good results from Sahli's **Inoculation Method,** which is simply, he says, a multiple von Pirquet's test done weekly.

Secondary Infections.—The invasion of the lungs by secondary organisms may occur under two conditions, i.e. either as a complication of a quiescent and healing tuberculosis, or in the course of an active progressive lesion. The treatment of these cases is surrounded by difficulties, as Habershon[11] shows. In the first place the presence in the sputum of infective organisms other than the tubercle bacillus is no proof that the patient is suffering from a toxæmia due to any of these, for normally a variety of pathogenic bacteria are present in the mouth and air-passages. How then are we to determine, in cases of pulmonary tuberculosis with febrile disturbance and the presence of such bacteria in the sputum, whether the signs and symptoms are due to a primary tuberculosis or a secondary infection, and whether the secondary organisms are merely passive denizens? The methods available for guidance are: (1) The physical signs; (2) The symptoms, including the character of the sputum; (3) The bacteriological examination of the sputum; (4) The opsonic index. In the presence of signs of catarrh, especially if at the bases, and if at the same time the general condition is good without much fever, despite the presence of abundant signs, the moist sounds can be fairly attributed to a bronchitic condition; but if the temperature is raised it becomes more difficult to assign to each its proper share. The sputum in tuberculosis of the lung is usually purulent and nummular; whereas in catarrh, though abundant, it is rarely purulent, but rather frothy.

The most common catarrhal and other pathogenic organisms found are: (1) *Micrococcus catarrhalis*; (2) *B. Friedländer*; (3) Fraenkel's *Diplococcus pneumoniæ*; (4) A diplostreptococcus; (5) *Staphylococcus aureus*; (6) A streptococcus; (7) *B. coli communis* (rare). To decide on the activity of an organism found in the sputum, Habershon relies upon the opsonic index, holding that no other means can

determine whether the febrile disturbance is due to the tuberculous toxæmia, or to that of the secondary organism, or to both. Where more than one secondary pathogenic organism is present, this means an elaborate investigation which is not feasible in the majority of cases; in all such instances, however, he holds that at least the opsonic index to tubercle should be determined. He finds the inverse ratio between the tuberculo-opsonic index and the temperature, an important aid in the differentiation between the toxic effects of tuberculosis and those due to secondary organisms. In most cases we must be guided by physical signs and symptoms; and if several organisms are present, we should try in the first instance a **Vaccine** prepared from the preponderating one, passing later, if necessary, to the trial of other vaccines, if more than one secondary organism is present. It is only natural that amid all these difficulties the results of vaccine treatment should be variable; in Habershon's experience the best results are obtained when the primary tuberculous affection is inactive and the secondary symptoms of bronchial catarrh are prominent, *M. catarrhalis*, Fraenkel's diplococcus, and the *Friedländer bacillus* being the easiest to deal with.

Bardswell,[12] speaking in the same discussion, drew a distinction between a true secondary infection and a mere accompanying or intercurrent infection. The former is, in his experience, less common than is supposed. An investigation of 33 cases associated with all the signs and symptoms generally recognized as evidence of a mixed infection, showed the presence of the tubercle bacillus alone in 25. His experience of the vaccine treatment of cases of advanced pulmonary tuberculosis complicated by a mixed infection has not been encouraging, the difficulty of isolation of the infecting organism being great; but he has met with more success in the treatment of the accompanying and intercurrent type where the tuberculous process is limited and quiescent. Radcliffe made blood-cultures in the search for septicæmia in twenty-two cases, but with only one positive result, the organism in this case being the *Staphylococcus albus*, treatment by vaccine giving brilliant results.

The disappointing results too often met with in the treatment of acute febrile pulmonary tuberculosis by any of the methods hitherto proposed, led Hartley[13] to the trial of **Neosalvarsan,** to which his attention had been directed by the excellent results obtained in a patient with acute tuberculosis who gave a history of syphilis. Its action in many similar cases in which there was no syphilitic factor proved equally satisfactory. Three of these cases are reported in detail, and thirteen others have also received treatment on these lines. Not all have been equally successful; in one neosalvarsan was quite ineffectual, while in another the fall of temperature was temporary, pyrexia returning, though milder in degree. The good effects as a rule are not immediate, but show themselves in two or three days, the temperature then falling possibly to normal, where it may remain. In other cases the fall is not complete, and a second or, it may be, a

third injection may be required. With the fall in temperature a general improvement in the condition occurs, which may be very striking, and with this a diminution of cough and of expectoration. The drug was given intravenously and with the usual precautions, great care being taken that the water (125 c.c.) in which the remedy is dissolved had been freshly distilled. No ill effects have been observed in the sixteen cases treated.

Halls Dally,[14] in giving his impressions of the results of the intensive **Nascent Iodine** treatment of tuberculosis, warns us that in pulmonary tuberculosis final conclusions as to the value of a remedy can only be reached after some years. During the reactionary phase the bronchitis often masks the presence of crepitations, but as this subsides the signs of active tuberculosis are found to diminish or disappear. The general condition of the patients while under treatment is satisfactory ; a slight loss of one or two pounds on the average during the first fortnight is soon made up, and later the weight may continue steadily to gain. Cases which have previously lost weight, either cease to lose, or gain. Cough ceases after an exacerbation for a fortnight, and one finds usually that tubercle bacilli have disappeared. Subsequently there may be a little persistent dry cough. The sputum diminishes in quantity, and becomes less sticky and easier to bring up, this change applying to all cases except the advanced. Hæmoptysis is never sufficient to necessitate the suspension of treatment, though slight staining or even the loss of a few drachms may occur during the first week. For the first fortnight or so, dyspnœa may be increased owing to the bronchitis, but this soon improves. Occasionally, night sweats may occur where previously they have been absent, but in the end, with the lessening of the general toxæmia, nutrition improves. He has never seen harm result provided subminimal dosage be avoided, iodism being produced by small amounts of iodide, and not by doses of 10 gr. or more. The average dose of **Potassium Iodide,** which should be given after breakfast, is 20 gr., since this permits the therapeutic action of iodine in solution. With small doses of iodide (4 gr.) the effects are those of free iodine introduced into the blood, while with doses of over 4 gr. the action is that of iodine held in solution by varying proportions of potassium iodide (Reeve). Reeve[15] now treats nearly all patients with a morning dose of 20 gr. of potassium iodide instead of 30 gr. as formerly, and children down to three years of age stand this dose well. The iodide is given in half a pint of water, and four hours later one ounce of **Chlorine Water** in half a pint of lemonade, this dose of chlorine being repeated at two hours' interval ; three ounces of chlorine in all being administered at the start, which at the end of three weeks may be increased to four, and later to five ounces. Reeve has seen good results not only in pulmonary tuberculosis, but in tuberculous glands in children, which at first become swollen, but later subside rapidly; and also in cases of chronic discharge from the ear and nose, which diminishes after a period of increase.

On the basis of the experience of 121 cases, Carver[16] speaks highly of the value of **Pneumosan.** The cases chosen for treatment included many of whom little could be expected, cases of acute tuberculosis unsuitable for treatment by tuberculin, and patients who were not making good progress under tuberculin, the object of giving the pneumosan being to reduce the temperature and fit the patients for subsequent tuberculin treatment. The results were so satisfactory that it was determined to continue the administration of the drug, cough being diminished, and an increase of weight, appetite, and energy ensuing. Naturally, the success was manifested chiefly in first- and second-stage cases, but it acted well as a palliative in advanced cases. The method of treatment was intramuscular injection into the deltoid, employing each arm alternately and avoiding the site of previous injections ; the needle was plunged swiftly through the skin, and the injection made slowly, as it is likely otherwise to cause pain. The injection should if possible be given daily, the initial dose for an adult being 0·25 c.c., increased gradually to a maximum of 1 c.c. In no case was any local reaction observed, but pain was complained of in several cases, and general reactions, evidenced by a rise of temperature, were common; as treatment proceeded, the temperature usually steadied down, and only in very advanced cases did it maintain a daily variation of as much as 2°.

Wingfield[17] emphasizes the great importance of *attention to the mouth and teeth* in cases of pulmonary tuberculosis, not only as a factor in treatment, but also in eliminating many of the numerous cases which are suspected of pulmonary tuberculosis without having any definite signs or symptoms. He has found that the pyrexia, which is the chief ground of suspicion of tuberculosis, may be entirely due to oral sepsis, and may entirely subside when this condition is rectified. Where, on the other hand, the fever is due to tuberculosis, it will remain unaffected.

Raeburn[18] has found **Emetine** valuable not only in cases of hæmorrhage (*see* MEDICAL ANNUAL, 1914), but also for the relief of cough and the diminution of expectoration. He divides his cases into three groups : (1) Bronchitis, without tuberculosis ; (2) Tuberculosis, without T.B. in the sputum ; (3) Tuberculosis, with T.B. in the sputum. The cases in (1) nearly always improved rapidly on treatment by emetine, provided the heart's action was not weak ; but in cases of heart weakness no improvement was seen. In (2) he thinks that improvement has been more rapid, and the loss of expectoration more complete, than with ordinary hygienic measures ; while in (3) he evidently found comparatively little benefit. He concludes, therefore, that the drug has no effect on the tubercle bacillus, but is a valuable aid in reducing congestive conditions in the lung. He employs small doses, and uses ampoules which contain $\frac{1}{2}$ gram of emetine in 15 min. of distilled water. This he dilutes in four parts of water, 4 min. of this dilution forming a suitable dose, given apparently twice weekly by injection.

Artificial Pneumothorax.—Continued evidence of the value of this procedure, which was fully dealt with in last year's MEDICAL ANNUAL, comes to hand. Saugman, quoted by Lillingston,[19] contributes the details of 100 cases in which the treatment was attempted nineteen months earlier, in 64 of which an effective pneumothorax was induced, adhesions preventing success in the remaining 36. He contrasts the fate of the two classes as follows :—

	Pneumothorax effective.	Pneumothorax prevented by adhesions.
Able to work ..	32	8
Unable to work..	18	12
Dead	14	15
Unknown ..	0	1
	64	36

In the first class the tubercle bacilli disappeared in 50 per cent, in the second class in only 8·6 per cent, of the cases.

The ideal condition for an artificial pneumothorax is unilateral active disease, with but slight or quiescent disease in the other lung, which has failed to respond to other methods of treatment. For early cases of less active disease a pneumothorax is unnecessary, as they do well as a rule with simpler forms of treatment. Cases with really profuse or recurrent hæmoptysis, and those with a bad prognosis should, irrespective of the stage of the disease, be added to the list of suitable cases. As Lyon,[20] however, points out, if we restrict ourselves to the ideal cases, the field for treatment would be a very limited one, as unfortunately such cases are too rarely met with. He has therefore sought to benefit cases of bilateral disease. Great care must evidently be taken in the selection of such bilateral cases. On the whole it may be said that the activity of the disease on the less affected side is the point chiefly to be considered. The formation of a pneumothorax on one side tends of course to throw an extra burden of work on the opposite lung, and in bilateral disease, if the opposite lung is the seat of an only partly arrested or still active process, even if limited in extent, the result of the operation will be but to break down the feeble arresting barriers and facilitate the spread of the disease in the less affected lung, actually hastening the patient's end. Inactive disease with a strong tendency to arrest is more likely to stand this strain than a recent invasion, even if the former be more extensive.

One can but repeat that great judgment must be exercised in each individual case of bilateral disease as to whether the lung on which the patient will have to exist is capable of meeting the extra work which will be thrown upon it. Lyon has sought to meet the difficulty by refraining from establishing at once a complete collapse of a lung where the disease extends beyond the apex on the opposite

side. He has found in such cases a partial pneumothorax, short of complete collapse, of great value, relieving the cough and amount of expectoration, and, most important, by restricting the mobility of the lung, limiting the absorption from the diseased areas and the consequent toxæmia. Under these circumstances the patient improves greatly, and not only is the spread of the disease on the side of the operation checked, but owing to the improvement in general health, the disease in the opposite lung is favourably affected. It is his practice to regulate the amount of nitrogen introduced by the conditions present, but he has usually limited the amount injected at the first attempt to 400 c.c. Many observers follow him and favour the introduction at the first sitting of a comparatively small quantity of gas, which can be increased according to circumstances later, until complete collapse is attained. Many unpleasant results are avoided by this procedure, and although the danger of a gaseous embolism, which though rare has proved fatal (Holmgren[21] had one fatal and one serious case in 1000 injections), is removed by the injection of oxygen before the nitrogen is allowed to run in, those who start with nitrogen must be careful about injecting it under high pressure. As pointed out in last year's ANNUAL, the manometer is the only guide, and the gas should not be allowed to flow in until the manometer shows large oscillations about a mean negative pressure. Holmgren points out that when the lung is emphysematous, even if the needle is lodged in the lung, small manometrical oscillations may appear about a mean negative pressure.

Woodcock[22] considers 300 c.c. a suitable amount to introduce at a first puncture, which on subsequent refills may be increased to 750 c.c. or as much even as 1000 c.c. Carlton and Evans,[23] who start with oxygen and continue with nitrogen only after 200 c.c. of oxygen have been introduced, make an end-pressure of zero their aim at the first filling, quite irrespective of the quantity of gas introduced, while at refillings the end-pressure should not exceed + 4 and + 6, a figure which they say has been shown by several observers to give the best results. This, again, bears no constant relation to the total quantity of gas introduced.

Woodcock gives several useful hints for the conduct of the technique. He places the patient a few hours before the operation in such a position that sputum may as far as possible be got rid of. Half an hour before the operation an injection of morphin. hydrochlor., $\frac{1}{8}$ gr. is given, and he believes in having the nitrogen warmed to the temperature of the body, which can be done by means of a hot-water jacket. At the end of half an hour novocain, $\frac{1}{6}$ gr., with adrenalin, is injected into the superficial tissues, and a similar quantity two minutes later into the deeper tissues ; others make a still deeper injection to secure anæsthesia of the pleura, with the aim of avoiding the dangerous symptoms of pleural reflex. The site of operation having been carefully sterilized, he places the patient in position, laying him on one side, turned slightly over on to his face in order to bring the site of

operation, for which he prefers if possible the posterior axillary border of the sixth interspace, uppermost. A pillow is placed beneath the patient in such a way as to arch the side of the chest and widen the intercostal spaces, while the arm of the side to be operated on should be raised and bent round the head. He believes in making sure, as soon as the needle is in the pleural cavity, that no vein has been punctured, and therefore fits a hypodermic syringe nozzle on a side-way passage on the needle to see if blood can be drawn. Others have not found this necessary, and rely on the movements of the manometer. He says that at the first operation there may be signs of faintness ; pallor, distress, and intermittence of the pulse demand the cessation of the operation and immediate stimulation, for which he finds 5 min. of liq. strych. hydrochlor. most useful. The patient must, of course, be kept in bed for a day after the first operation, but after several refills toleration is established, and the patient need only lie down on a couch for a couple of hours. Woodcock finds a refill necessary as a rule, in three days ; but after three or more refills have been made, the gas ceases to be readily absorbed, and intervals of a fortnight or even longer are sufficient.

Carlton and Evans prefer a longer period of rest in bed after the first filling—at least three days,—and preferably for a very considerably extended time.

Atropine-sulphuric Acid said to act well in checking night-sweats (*p.* 3); **Omnopon** as a sedative (*p.* 23); **Papaverine** in hæmoptysis (*p.* 24); **Phosphorus** said to be curative (*p.* 25).

References.—[1]*Boston Med. and Surg. Jour.* 1914, i, 953 ; [2]*Lancet*, 1914, i, 305, and *Brit. Med. Jour.* 1914, i, 1066 ; [3]*Amer. Jour. Med. Sci.* 1914, i, 540 ; [4]*Pract.* 1914, i, 74 ; [5]*Brit. Med. Jour.* 1914, i, 108 ; [6]*Münch. med. Woch.* 1913, 2515 ; [7]*Deut. med. Woch.* July, 1914, 1513 ; [8]*Lancet*, 1913, ii, 1382 ; [9]*Brit. Med. Jour.* 1913, ii, 1481 ; [10]*Ibid.* 1914, i, 1065 ; [11]*Bristol Med.-Chir. Jour.* 1914, 97 ; [12]*Ibid.* 125 ; [13]*Lancet*, 1914, i, 1602 ; [14]*Pract.* 1914, i, 804 ; [15]*Clin. Jour.* 1914, Aug. 522 ; [16]*Lancet*, 1914, ii, 372 ; [17]*Ibid.* 149 ; [18]*Brit. Med. Jour.* 1914, i, 703 ; [19]*Clin. Jour.* 1913, Dec. 601 ; [20]*Boston Med. and Surg. Jour.* 1914, ii, 329 ; [21]*Brit. Med. Jour.* 1913, ii, 1604 ; [22]*Ibid.* 1055 ; [23]*Ibid.* 1534.

TUBERCULOSIS, SURGICAL. (*See also* Amputations ; Spine, Caries of.) *F. W. Goyder, F.R.C.S.*

Cervical Glands.—Muller[1] summarizes his practice thus : "At all times we must remember that we are dealing with a human being infected with tuberculosis, and not merely treating a case of tuberculous glands. Success depends entirely upon keeping this in mind. After a careful history has been obtained and an examination made, the portal of entry can usually be surmised ; if necessary, the tonsil, adenoid, or carious tooth should be removed, and any ulcer, scab, pediculosis, otitis, etc., attended to. In those cases seen early, with only a small area involved and the child in good general health, an operation should be advised. If the social position permits, the dissection should be confined to the macroscopic group, and the child sent to the sea-shore and kept there for a year, the general and

hygienic details of treatment being carried out with scrupulous care. In the case of the poor child, or where such treatment cannot be carried out, the entire submaxillary and cervical chains above the omo-hyoid should be excised. The general treatment must then be carried out at home. If the case is seen late, with one or both sides choked up, the *x* ray is often of advantage in reducing the hyperplasia, and a radical dissection can be carried out at an opportune time. If caseous abscesses or sinuses exist, they should be opened, curetted, and an effort made to clean up thoroughly the tuberculous granulation tissue, after which the *x* ray is often invaluable in promoting healing. By these methods 85 per cent of cases have been cured without recurrence." He estimates that 94 per cent of children from seven to twelve years of age have enlarged cervical glands, and two-thirds of these are tuberculous. Large glands are almost invariably caseous. Only early cases are likely to be cured by hygienic means alone.

Ladd[2] is disappointed with the results of *x* rays and of tuberculin. Heliotherapy, except at high altitudes, is also disappointing. In patients who have had more than one gland involved, palliative surgery has nothing to recommend it. He insists on the importance of enucleation of the tonsils in every case. Simple tonsillotomy leaves a focus of infection. He concludes: "Thorough extirpation of all infected glands with the primary focus yields by far the highest percentage of cures of any form of treatment yet devised. Active tuberculosis of the tonsils in cases with cervical adenitis is probably far more common than has been supposed. Of tonsils removed by operation showing no obvious signs of tubercle, histological examination proved its presence in 65 per cent. To accomplish a cure by radical surgery requires far less time than by other means. To avoid unsightly scars, the patients should be operated on before the glands have broken down. Hygiene has a very important place in treatment."

Neve,[3] reporting the results of 800 operations, insists on the importance of preliminary treatment applied to the primary focus and to the general condition. In most cases radical operative measures are advisable. Ten per cent of recurrences occurred in his series.

Jefferson[4] points out that radical operation for removal of glands, although rational and usually best, is not without danger, especially where sepsis co-exists. Preliminary treatment of sinuses, e.g., by iodine, is advisable. He describes two cases which died within twenty-four hours of operation from neglect of this precaution. The cause of death was acute streptococcal infection.

Joints.—Ely[5] holds that **Injection Treatment** is useless, as the injected material cannot reach the disease, which is situated beneath and not on the surface of the synovial membrane. This is directly opposite to the views of Murphy, who states that he has had good results from the injection of 2 per cent formaldehyde in glycerin in early cases of joint tubercle. Ely contends that Murphy's work is based on a mistaken idea of the pathology.

Orr[6] believes that the results of conservative treatment of tuberculous joints in adults are worse than in children, solely because the after-treatment in adults is more inefficient. He finds that patients operated on averaged a period of active disease much more than twice as great as those treated conservatively; also that the amount of deformity after operation is much greater than if no operation is performed, and that the mortality is much greater with operation than without. Fixation is the main element in the conservative treatment of joint tubercle. In the discussion following this paper, most of the speakers favoured operative treatment in adults, especially at the knee joint.

Conservative Treatment of joint, as of other forms of tubercle, in adults as in children, is exclusively practised at Berck-Plage. Sea air, good food, and sunshine are the chief factors in the general treatment. Local treatment, according to Daw,[7] consists in extreme conservatism. The avoidance and correction of deformity are aimed at, strict immobilization being maintained in the most favourable position, chiefly by carefully applied plaster-of-Paris splints. Successive plasters are applied in an improved position until, finally, deformity is corrected as much as possible, if not completely. In spinal caries ambulatory treatment is not advised. In lumbar and cervical caries Calvé employs hyperextension; in dorsal cases he regards it as futile, and likely to increase the deformity. This latter is best got rid of by cutting a window over the prominence, and packing with layers of cotton-wool. Even in recumbent cases plaster jackets are used. Suspension is essential during their application, the 'Minerva,' which includes the chin and occiput, being used for upper dorsal and cervical cases, while the neck is excluded if the caries is lower. In all cases the plaster must take its support from the pelvis, and careful fitting is even more essential in this than in any other region. Ménard says that repair does not begin till the third year; hence three years is the minimum treatment for children, but in adults the disease lasts for ten to fifteen years, of which eight usually pass before a diagnosis can be made. During convalescence, patients are allowed to walk about in plaster cases; later, removable celluloid jackets are employed. Abscesses are treated by aspiration, with or without injection of thymol camphor or iodoform oil. Calot practises intra-articular injections in the absence of abscess. (*See also* SPINE, CARIES OF).

Heliotherapy, as practised by Rollier at the high altitude of Leysin in Switzerland, enjoys an increasing popularity. Gauvain and de Voss[8] attribute Rollier's good results chiefly to the rigorous conservative methods employed. They say: "Heliotherapy is an adjuvant to treatment, and as such is of the greatest value; but the indications for its employment and its limitations should be very clearly recognized. It appears to have its greatest field of usefulness in the treatment of septic cases, and the functional results which follow its employment are often undoubtedly good."

A good account of the method is furnished by Charlotte Warner,[9] according to whom immobilization is certainly not strict. No plaster casings are used, and a certain amount of active movement is permitted. The advantages of rest are utilized, and the disadvantages of absolute immobility avoided, in joint tubercle, "by carefully balanced treatment." In all cases there is great diminution in deformity and increase in mobility. To avoid too great a reaction, very gradual increase in the time and extent of the exposure to the sun must be carried out. At first, the feet only are bared, and for a short time. Area and duration are gradually increased until, finally, the patient can stand six to seven hours daily practically naked. The local focus is exposed last and under precautions, since over-exposure can give as violent a local and general reaction as an over-dose of tuberculin. The greatest care has to be taken to avoid sunburn and sunstroke. It is claimed that the excessive pigmentation of the skin which occurs prevents this. Control by *x* rays is regarded as essential. Tuberculin is not used. Where sunlight fails, its place may be partly taken by *x* rays. In skiagrams, healed bone tubercle is characterized by (1) Disappearance of atrophy; healthy, often exaggerated, lime-salt content (sclerosis); (2) Reparation of structure; (3) Sharp demarcation; (4) Regenerative processes, e.g., formation of osteophytes, ne-arthrosis, and remoulding of existing joints; (5) Absorptive phenomena.

Tuberculin treatment apart from other methods is no longer receiving the same support as formerly. In vesical tubercle, however, it seems to be the only effective remedy. Walker[10] finds T.R. a valuable adjunct to operative treatment in reno-vesical and genito-urinary tubercle. Swenson[10] says, "Tuberculous gland infections that have not entered the stage of caseous degeneration have yielded to tuberculin treatment. Almost all local tuberculosis may be cured under persistent, skilful, surgical treatment, assisted by tuberculin injections properly given. Injections may be safely given every tenth or twelfth day without opsonic work. Tuberculin treatment must be continued from one-half to two years. Hygienic treatment is of vital importance." [With regard to the first statement, it may be noted that it is impossible to prove, apart from operation, that glands in the precaseous stage are tuberculous at all.—F. W. G.]

A number of Continental writers have investigated the claims of Friedmann's remedy, and have reported unfavourably. Thus Karewski[11] says that in only one of fifty cases treated was there any improvement. His experience of the treatment shows that it does not cure, nor assist in surgical treatment, does not prevent recurrences, does not immunize, and is not without danger. Hence it should not be employed in place of other well-proved methods. Wiehmann,[12] who has tried it in lupus, says: "Seeing that we have to deal with a therapeutic measure which is dangerous, since it can produce activity in latent lesions, whose immunizing properties are by no means proved, and whose healing properties are a mere possi-

bility, it should never be used unless expressly demanded by patients after its risks are explained." Kahn and Seemann[13] found that in all cases, in surgical and in laryngeal tubercle, the results were bad, although the well-known methods of treatment were used in addition, and in most the general condition of the patients became worse. In bones and joints one case was improved, two unaltered, and eight were definitely worse. Drachter[14] states: "In an overwhelming majority of our cases we have seen no improvement which could with any certainty be put down to the Friedmann method. Some cases have become decidedly worse."

Oppenheim[15] reports good results in children from the use of **Copper-Lecithin** preparations. Unless the copper comes into direct contact with the lesion, it appears to be valueless. Organic preparations of copper appear to be forty times as powerful as inorganic ones. Tubercle bacilli are killed by solutions of copper 1000 times weaker than are necessary to kill the saprophytic organisms in air. Of 31 cases treated, 20 were cured, 7 distinctly improved, and 4 improved. Fistulous masses are laid open, scraped free from granulations, and the cavities filled with wax containing 0·25 per cent of copper. This wax has a melting-point of 65° C. The plugs are left till they fall out, when the wound closes by granulation. It may be advisable to repeat the plugging. The plug also acts as a drain. The author regards the method as more rapid than, and superior to, bismuth paste, *x* rays, and pyrogallol, and there is no danger of poisoning. The copper appears to excite leucocytosis, and to have a selective action for tuberculous tissue.

Martin[16] says that isolated *tubercle of the clavicle* is rare. It occurs in adolescence, and more frequently still in adult life. Most commonly it exists as part of a tuberculosis of the acromio-clavicular and sterno-clavicular joints. Apart from joint affections, the sternal end is more frequently affected than the clavicular; both are much rarer than osteomyelitis of the shaft. Surgical intervention is stated to produce good results.

Bismuth Paste, and its value in regard to sinuses, discussed (*p.* 4).

References.—[1]*Ann. Surg.* 1913, ii, 443; [2]*Boston Med. and Surg. Jour.* 1914, i, 532; [3]*Brit. Med. Jour.* 1914, i, 813; [4]*Lancet*, 1914, i, 1314; [5]*Jour. Amer. Med. Assoc.* 1913, ii, 1453; [6]*Ibid.* 1370; [7]*Brit. Jour. Surg.* 1914, Jan. 518; [8]*Brit. Jour. Tubercul.* 1914, Apr. 63; [9]*Med. Chron.* 1914, Feb., 414; [10]*Surg. Gyn. and Obst.* 1913, ii, 437; [11]*Berl. klin. Woch.* 1914, 1034 and 1069; [12]*Ibid.* 1038; [13]*Deut. med. Woch.* 1914, 1420; [14]*Ibid.* 1422; [15]*Berl. klin. Woch.* 1914, 1119; [16]*Arch. Gén. de Chir.* 1914, 796.

TYPHOID FEVER.

E. W. Goodall, M.D.

C. E. Woodruff[1] brings forward evidence in favour of the view that apparently an attack of typhoid fever, if it does not actually predispose to tuberculosis, at any rate rouses into activity a pre-existing tuberculous focus.

Symptoms.—N. B. Potter[2] draws attention to *ulcerative angina* as an occasional early symptom in typhoid fever, and gives a detailed account of six cases. It usually takes the form of small, superficial

ulcers on the soft palate and its pillars, and on the uvula. Their importance lies in the fact that their presence not infrequently gives rise to the diagnosis of syphilis or of diphtheria. From the references given to the literature of the subject, it would appear that they have been observed more frequently in the United States and on the Continent than in the British Islands. They occur fairly early in the disease. Potter thinks they are probably due to a secondary infection (by staphylococci, streptococci, and other organisms) upon a mucous membrane altered by the existing disease.

Two cases of *typhoid spine* are reported by Elkin and Halpenny.[3] Both occurred in males. The symptoms came on during convalescence. Skiagrams showed distinct evidence of disease in the spinal column, compression of the border of the vertebræ, disappearance of intervertebral discs, and formation of new bone at the sides of the vertebræ. The treatment consisted of rest, which was obtained by the application of a plaster jacket, confinement to bed, and giving morphia when the pain was severe. (*See also* RHEUMATOID ARTHRITIS).

Two cases in which *chronic obstruction* (*due to thrombosis*) *of the iliac veins*, and possibly also the inferior vena cava, were shown at a meeting of the Royal Academy of Medicine in Ireland on Dec. 5, 1913.[4] In one case the patient, a man, underwent an attack of typhoid in 1893, during which laparotomy was performed on him because of acute pain in the right iliac region, suggestive of perforation; but no lesion could be found. Symptoms of obstruction of the veins set in two years later. The other case was that of a man who had an attack of typhoid in South Africa during the Boer War. Soon after the attack, swelling of both legs was noticed. Apparently he recovered from this; at any rate he was not troubled seriously with it, for, having left the Army, he entered the Canadian Police and served till 1904, when the veins of the legs began to be enlarged.

Four cases of *cholecystitis*, presumably due to *B. typhosus*, are reported by A. E. Morison.[5] In only one of these did the patient suffer from a definite attack of typhoid fever, in two he had been exposed to infection, while in the fourth case there was neither a history of exposure to infection nor any definite symptom except a positive Widal's reaction. "Simple drainage · (**Cholecystostomy**) does not always cure; after it the symptoms subside for a time, but the drainage wound closes, attacks recur, and the only effectual cure may be **Removal of the Gall-bladder.** Puncture of the distended gall-bladder with an exploring needle is a risky procedure in these cases. After the needle has been withdrawn, leakage from the viscus may occur." In one case Morison saw very severe shock follow puncture.

The most efficacious treatment is large dosage with **Sodium Salicylate** (15 to 30 gr.) given in an effervescing mixture every four hours until its physiological effect is produced, and abundant drinks. The salicylate should be continued in small doses for a month after convalescence has been established.

Berkowitz[6] records the case of a woman, age 31, who was attacked with typhoid fever during the fifth month of pregnancy. She went through a severe attack, recovered, went to full term, and was delivered of a full-sized male child. During the attack of fever the mother's blood-serum had given a positive Widal's reaction ; but immediately after delivery, and on several occasions afterwards, the serum both of the mother and child was negative, as also was the mother's milk.

The history of a woman who, after an attack of typhoid fever in 1905, became a *chronic intermittent urinary carrier*, is related by Davies and Walker Hall.[7] In 1910 ten small calculi, lying in a mass in the pelvis of the right kidney, were removed by operation. There was no definite evidence of pyonephrosis. The removal of the calculi did not free the urine from bacilli. They disappeared a few days after the operation, but soon re-appeared, and persisted for eight months. Since the end of that period (August, 1911) the writers failed to demonstrate typhoid bacilli in the patient's urine up to the date of the report (Nov., 1913). Typhoid bacilli were found in the calculi.

Prophylaxis.—*Protective Inoculation.*—In an historical account of antityphoid inoculation, Major F. F. Russell,[8] of the U.S. Army, attributes the general want of adoption of this prophylactic measure chiefly to two things : (1) The undoubted failure to secure anything like absolute protection against infection and death ; and (2) What he terms Wright's unfortunate doctrine of the negative phase. It will be remembered that, according to this doctrine, the inoculated person was for a few days after inoculation rendered more susceptible to the disease ; hence there was great reluctance to inoculate in the presence of an epidemic when there was a chance of infection at any time. This doctrine has, however, now been abandoned.

In the U.S. Army, antityphoid inoculation has been compulsory for the last three years. In last year's Medical Annual the statistics of the results to the end of 1912 were given. They showed a remarkable fall in the number of cases. In the present paper, Russell states that for the first nine months of 1913 there was not a single case. Before inoculation was introduced there had usually been about 100 cases in the first nine months of every year. On Jan. 1, 1912, antityphoid inoculation was made compulsory in the U.S. Navy.

In discussing the immediate effects of an inoculation, Russell makes one or two interesting statements. Referring to the compulsory inoculation of the Navy, inaugurated on Jan. 1, 1912, the inoculation of practically the entire naval personnel was completed without a single serious result or casualty. About 1 per cent had reactions necessitating rest in bed, and but a small percentage of individuals required to be excused from duty. In the Army, in over 97 per cent of those inoculated there was either no or a very mild reaction. In less than 0·5 per cent was the reaction severe. About 200,000 men were inoculated without a single fatality or serious complication.

Sir William Osler,[9] in an address on " The War and Typhoid Fever," states that amongst the several hundred thousand inoculations which

have been performed amongst the troops in the British Islands during the three months since the war began, the serious sequelæ have been very few. As various statements had been made, by those who are opposed to inoculation, to the effect that most baneful results had occurred, Sir William took pains to investigate the alleged occurrences. Consequently he had brought to his notice probably nearly if not quite all of the untoward effects. They appear to have been rare. In a very few cases there is sharp fever, with giddiness and fainting, or erythematous rashes about the joints, and purpura. He also relates two or three cases of appendicitis, pneumonia, jaundice, arthritis, and "symptoms suggestive of enteric, and some enteric itself." [It is quite a question, however, whether these pneumonia, appendicitis, and enteric cases were not coincidences, or cases in which infection with enteric had taken place before the inoculation.—E. W. G.]

Russell says that it is the practice in the U.S. Army to inoculate against typhoid and vaccinate against small-pox simultaneously. If the vaccinia be severe, the second dose of the typhoid prophylactic is postponed a few days. He recommends subcutaneous in preference to deep injections of the vaccine, because slow rather than rapid absorption is required. He objects to the use of a vaccine in which living typhoid bacilli are used, as has been recommended by Castallani and by Metchnikoff in his sensitized vaccines, because of the risk of contamination with other organisms. He also writes: "Although it appears to be safe to inject attenuated vaccines subcutaneously, it is still a question whether they could be handled safely and might not accidentally infect persons by the mouth."

The prophylactic inoculation of civil communities appears to be gaining ground in some places in the United States. A. Meyer[10] states, in greater New York, of 47 hospitals and institutions, in 28 the nurses were immunized; but inoculation was voluntary in all but six, where it was compulsory. Ebersole[11] gives some figures relating to 23 hospitals in Massachusetts and to small epidemics in Vermont and Connecticut, which go to show the value of the measure.

A. Castallani[12] advises that persons who reside in countries such as Ceylon, where typhoid and paratyphoid (A and B) fever are prevalent, should be protectively inoculated with a mixed vaccine of the three organisms concerned. He has found that a vaccine composed of 500 million typhoid bacilli and 250 million each of paratyphoid A and B, in 1 c.c. is efficacious. He uses either dead bacilli (killed by heating at 53° C.) or living bacilli attenuated by heating for one hour at 50° C. The dose is 0·6 c.c., followed in a week by 1·2 c.c. for adults, and half these amounts for children. Castellani has found that the amount of agglutinins elaborated for each of the three organisms is practically the same as when each organism is used separately. The reaction is as a rule not distinctly more severe than such as follows an inoculation of typhoid vaccine alone.

Arnold Renshaw[13] describes a *speedy method of inoculation of troops* which he believes will prove of service when time is limited.

The vaccine, contained preferably in a 20-c.c. bottle, is poured into a cold sterile watch-glass or Petri dish and sucked up into a cold sterile all-glass 20 c.c. syringe graduated into ½ c.cs. This is done more rapidly without attaching a needle. Some 20 to 40 sterile needles, boiled in water to which a little soda has been added, should be available, as also a pair of sterilized dressing forceps for picking out the needles. In the case of 1-c.c. doses as many as 20 inoculations can be made from one syringeful by merely throwing off a needle after each inoculation and affixing another. The men being lined, an assistant (unqualified), slightly in advance of the operator, prepares the skin with 2 per cent iodine, and another assistant behind the operator repeats the iodine application so as to seal the puncture with iodine after the inoculation. The chief precaution to be observed is to keep the needle pointing downwards to prevent the weight of the piston drawing into the syringe the tissue fluid from the last man inoculated. A fairly long needle will also prevent this reflux, as also the gradual removal of the needle towards the end of the inoculation. This procedure will allow of 80 inoculations in an hour.

Gay and Force[14] have devised a reaction which they state is, in their opinion, of value in determining whether a person is immune against typhoid fever. By means of a specially constructed chisel, two small abrasions are made in the skin of one of the arms. Into one of these abrasions is rubbed a solution obtained by inoculating 250 c.c. of 5 per cent glycerin bouillon with *B. typhosus*, incubating for five days, and reducing to one-tenth of the original volume by evaporation; into the other is rubbed some control solution, 5 per cent glycerin bouillon evaporated to the same volume. Observations of the reactions are made six and twenty-four hours later. In a positive result a red areola appears round the abrasion which has been rubbed with the typhoid bouillon. In only a very few of the control abrasions is an areola produced. If there is an areola in each abrasion, a difference of 2·5 mm. between the size of the two areolæ is chosen as showing a positive reaction. In a positive reaction the areola measures 4 to 12 mm. in diameter, is a little indurated, and is well defined. In a negative reaction there is no reaction in either abrasion, or else the same reaction in both. Of 21 cases with a definite history of typhoid fever, 1 gave a negative reaction. Of persons without a history of previous typhoid, 85 per cent showed a negative reaction. The authors give figures to show that previous vaccination against typhoid will usually produce a positive result.

A simple method of *disinfecting typhoid stools* has been devised by Kaiser. It consists in adding enough hot water to cover the stool in the receptacle, and then adding about one-fourth of the entire bulk of quicklime (calcium chloride), covering the receptacle and allowing it to stand for two hours. The hydration of the lime generates enough heat to destroy the typhoid organism. The method has been investigated by Linenthal and Jones,[15] and their experiments go to show that it is efficacious. The water used should be of the temperature

of 50° to 60° C. The lime should be used in lumps broken up in small pieces and distributed over the stool.

TREATMENT.—W. P. MacArthur[16] treated 63 cases with **Vaccine** in the Mauritius. From 61 of the 63 the causative organism was isolated, either from the blood (58), or from the fæces (3). The cultures from the other 2 cases were negative, but there was no doubt about the diagnosis. There were only 2 deaths amongst the 63 cases, a fatality of 3·1 per cent, which is very low for this disease. The dosage varied with the age and condition of the patient; for adults, the initial dose was usually 150 to 300 million. Increasing doses were given at two or three days' interval. The largest dose given was 1500 million. Forty-five of the cases came under treatment before the tenth day of the illness. In none of these did any complication or relapse occur, with one exception, a case fatal from bronchopneumonia. In 11 the patient had been ill for a fortnight or longer. In several of these complications arose, and there was 1 fatality from hæmorrhage. In most cases a stock vaccine was used. (*See also p.* 36.)

From an excellent article on *perforation* in typhoid fever by George E. Armstrong,[17] we quote the following noteworthy remarks: "What symptoms call for immediate abdominal incision, or rather, what are the minimum of signs that may demand surgical intervention? Persistent pain, definite change for the worse in the expression of the patient, tenderness (either abdominal or rectal), rounding up of the abdomen, and increased resistance to pressure—if these symptoms are present, even if the temperature and pulse are not decidedly altered nor vomiting occurs, the likelihood of a perforation is very great.

"Local anæsthesia has very materially altered our attitude towards early operations. It is no longer necessary to administer a general anæsthetic. The abdomen can be quite well opened under local anæsthesia without causing the patient any pain whatever. . . . A 1 per cent solution of novocain, with the addition of two drops of adrenalin, 2 min. to 1 dr., is thoroughly satisfactory, and may be used freely. First inject the skin and subcutaneous tissue, and then with a needle 1 in. long, penetrate the deeper muscular layers along the line of incision. Either a gridiron incision or one along the outer border of the right rectus answers admirably." At the Royal Victoria and Montreal General Hospitals the results of operation for typhoid perforation have been excellent. Out of 140 cases in which the perforation was closed, 38 recovered, or 27·14 per cent.

"Early operation is most essential if success is to be obtained. An important point is to let the house staff feel that it is a reflection on their professional attainments to overlook a perforation. When once they really appreciate that fact, cases are sent to the operating-room promptly."

A case of recovery in which a *spontaneously ruptured spleen* was removed by operation is reported by Conner and Downes.[18] The

patient was a medical man, age 36. After rather more than a week's illness, he was seized with sudden, sharp, stabbing pain in the left hypochondrium, with aching pain in the left shoulder, extending down the arm. His general condition became much worse; the expression was anxious, the eyes were sunken, and the respiration was shallow. The splenic dullness was increased, and there was tenderness and slight rigidity in the left hypochondrium. Some improvement set in and was maintained for three days, when the symptoms returned after an attack of coughing. The diagnosis of rupture of the spleen was made, and laparotomy was performed. A rent three inches in length was found running along the posterior border of the spleen, which was then removed. A layer of old laminated blood-clot was found lying directly over the dorsum of the spleen, so that probably the attack of coughing set up a second rupture at the place of the first, which was in process of repair. The author gives a summary of twelve reported cases of rupture of the spleen in typhoid, all of which were fatal.

Llewellyn Phillips[19] recommends **Liquid Paraffin** for the treatment of the constipation which is so common during convalescence from typhoid. The drug should be given in a dose of half an ounce at night, followed, if that has proved insufficient, by another half-ounce the next morning. It is best taken floated on the top of a little soda-water.

Phylacogen recommended (*p.* 26).

REFERENCES.—[1]*Amer. Med.* 1914, 17; [2]*Boston Med. and Surg. Jour.* 1914, ii, 137; [3]*Brit. Jour. Surg.* 1914, Apr. 602; [4]*Brit. Med. Jour.* 1914, i, 27; [5]*Ibid.* 1913, ii, 1578; [6]*Amer. Jour. Obst.* 1914, May (*Brit. Med. Jour.* Epit. 1914, i, 94); [7]*Lancet*, 1913, ii, 1306; [8]*Amer. Jour. Med. Sci.* 1913, ii, 803; [9]*Brit. Med. Jour.* 1914, ii, 909; [10]*Med. Rec.* 1914, i, 699; [11]*Ibid.* 1913, ii, 894; [12]*Brit. Med. Jour.* 1913, ii, 1577; [13]*Lancet*, 1914, ii, 470; [14]*Arch. Int. Med.* 1914, Mar. 15; [15]*Boston Med. and Surg. Jour.* 1914, i, 48; [16]*Brit. Med. Jour.* 1914, ii, 175; [17]*Lancet*, 1914, ii, 307; [18]*Amer. Jour. Med. Sci.* 1914, i, 332; [19]*Lancet*, 1914, ii, 231.

TYPHUS FEVER. *E. W. Goodall, M.D.*

H. Plotz[1] has isolated from cases of typhus fever an organism which he believes may be the cause of that disease. In a preliminary note he describes it as being a Gram-positive, pleomorphic bacillus, from 0·9 to 1·9μ in length. He gives very scanty information respecting the experiments. and promises further communications.

In a preliminary note, E. C. Hort and W. W. Ingram[2] record the results of their examination of blood, urine, and cerebrospinal fluid of twenty-five cases in Belfast. In these three fluids, in all the cases, before the crisis, a minute organism was found. It was also found in the fresh urine of five bonnet monkeys in whom, after the lapse of a well-marked incubation period, these observers had induced a continued fever by inoculation of human typhus blood collected before the crisis. It disappeared from the urine of the injected monkeys after their fever had subsided. The organism is cocco-bacillary in form, between 0·25μ and 0·6μ in its greatest diameter

and in its smallest forms passes through carefully tested Berkefeld filters. It is both Gram-positive and Gram-negative in the same preparations. In the fresh, and also in the incubated blood and urine of both man and infected monkeys, a similar though larger organism has been found by Hort and Ingram ; it is also cocco-bacillary in form. It appears to be the same organism that has been found and described by previous observers. It can be grown on the ordinary media. When injected into monkeys these large organisms produce no effect.

References.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 1556 ; [2]*Brit. Med. Jour.* 1914, ii, 15.

ULCERS OF THE LEG. *E. Graham Little, M.D., F.R.C.P.*

Ravogli[1] divides these into two great classes : (1) Specific, in which he includes syphilis and tubercle ; and (2) Non-specific. In the latter, traumatism, constant irritation, and pressure are the chief factors at work. Prolonged erect posture is a direct cause, as in some occupations. The part played by varicose veins is disputed, but there is reasonable ground to attribute a considerable share in causation to this element. Three stages in ulceration may be distinguished, and treatment will differ according to the stage with which we have to do. These are necrosis following upon acute inflammation, sloughing, and reparation. In the first stage, pastes and any application which checks the discharge are mischievous. Hot solutions of **Sodium Bicarbonate,** or, if the discharge is very foul, solutions of 1–5000 to 1–2000 of **Mercuric Chloride** or **Phenol** 1 to 2 per cent are to be preferred, applied as compresses. If possible, the leg should be kept in a horizontal position. When the gangrenous detritus begins to slough away and healthy granulation tissue appears, this should be protected with dressings, such as a mixture of castor oil with 10 to 50 per cent of **Peruvian Balsam.** An ointment of **Diachylon** with one drachm of **Ichthyol** to the ounce, or of 20 gr. of **Calomel** to an ounce of **Benzoated Oxide of Zinc,** may be used. **Scarlet-red Ointment** has not proved a success in this author's hands. When the surface is clean of necrotic matter, and the process of repair has set in, the ulcer may be painted with **Mild Tincture of Iodine,** or **Nitrate of Silver** 3 to 6 per cent, every two or three days, and dressed with gauze to protect the part from friction and contamination. **Massage** of the leg is very useful.

The very full literature on this subject is reviewed by Winkelried Williams[2] in a most useful paper, the perusal of which is recommended to all. The author relies extensively on internal treatment, with **Iodides, Mercury, Aloin, Strychnine,** and **Belladonna.** In 90 per cent of his cases he found more rapid and lasting benefit with a combination of mercury and iodides than with any other treatment. Where these fail, **Sodium Salicylate** with **Sodium Bicarbonate** proves effective. In cases where there is a large callous area round the ulcer, large doses of **Citric Acid,** given for four days, may be recommended,

in combination with the use of Bier's **Suction Cups.** Where there is constipation, and much discharge from the ulcer, frequent small doses of **Magnesium Sulphate** should be given. For local application the following routine is adopted: A solution of **Anæsthesin** is painted over the ulcer, which is then covered with lint thickly spread with **Starch Iodide Paste** made to this formula: Starch 10·5, glycerin 20, water 60. Boil, and when nearly cold add tinct. iodi fort (B.P. 1914) (*liq. iodi*, B.P. 1885) 5. The ulcer when very foul may be cleansed with terebene suspension in water, or with rags soaked in lamp oil.

Speirs[3] recommends spraying the ulcer with pure **Sulphurous Acid,** after a preliminary clean up with warm carbolized water. The cavity is then filled up with powdered **Boric Acid,** and the surface covered with strips of adhesive plaster 1½ in. broad, and the whole limb bandaged over. This dressing is to be changed when the discharge shows signs of soaking through.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1914, ii, 387; [2]*Brit. Med. Jour.* 1913, ii, 924; [3]*Ibid.* 1625.

ULCER, TROPICAL. *Sir Leonard Rogers, M.D., F.R.C.P.*

G. Duncan Whyte[1] describes a form of ulcer met with in South China exclusively in old men, spreading rapidly by undermining, leaving a sloughing surface, but clearing up and healing rapidly under oxidizing lotions, such as **Peroxide of Hydrogen** and **Permanganates.** The patients came from tidal estuaries and rivers. In nearly all the cases the ulcer was on the leg, and varied in size from 4 to 8 square inches. Poulticing and antiseptic treatment were worse than useless; but applications of peroxide of hydrogen rapidly cleaned up the surfaces, and quick healing followed. [The reviewer met with similar cases which were causing much loss of labour on Assam tea gardens in 1910, and found that cold compresses of 1 per cent permanganate of potash rapidly healed them, and that peroxide of hydrogen was also useful. He has since found permanganates of the greatest value in severe bedsores.—L. R.]

REFERENCE.—[1]*Med. Press and Circ.* 1914, i, 307.

UNCINARIASIS. (*See* ANKYLOSTOMIASIS.)

URETER, SURGERY OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Anastomosis.—Sejournet[1] arrives at the following conclusions: Healing in end-to-end suture of the ureter is the more perfect according to the accuracy with which the ends were adjusted. In suture by invagination, the segment invaginated is absorbed according to Poggi, but according to Taddei there is a kind of retraction, and the two fragments become united end-to-end. Healing by second intention favours the development of stenosis. Having completed the anastomosis, it is necessary to protect the suture line by the application of parietal peritoneum, or further, by a small graft of omentum.

Too much tissue should not be wrapped around the tube, or fibrous contraction and stricture will result. It is prudent, but not absolutely necessary, to place a drain in the neighbourhood of the suture. The prognosis of suture of the ureter is comparatively favourable. An escape of urine is usually temporary and ceases spontaneously. It is especially in such cases that there is a danger of stenosis at a future date. The flow through an anastomosed ureter is very abundant, but the stream is feeble. It is necessary to make a cystoscopic examination and catheterize the ureter in order to make certain of the activity of the kidney and the result of the suture.

Repair of Defects.—Eisendrath[2] finds that the structures that have been employed with this object are (*a*) segment of an artery, (*b*) segment of a vein, (*c*) dog's Fallopian tube, (*d*) segment of the bowel or vermiform appendix. He divides the results in these methods into three groups: (1) The flap became necrotic, and general peritonitis resulted; (2) The proximal end of the ureter became adherent to the abdominal wall, and a urinary fistula resulted; (3) The transplanted segment survived, but gradually became converted into connective tissue, with resultant stenosis and hydronephrosis. The results of all these experiments were uniformly unsuccessful. Eisendrath experimented on dogs, using an excised portion of the fundus of the bladder. The results resembled those obtained by other methods.

Implantation into the Bowel.—Beck[3] records two cases. The first was one of tuberculous bladder; the second, cystitis and fistula of the ureter after removal of stone. The right ureter was implanted into the cæcum and the left into the sigmoid flexure. The first case died, but the second was alive several months after the operation.

Uretero-vesical Cysts (*Prolapse of the Ureter*).—Caulk[4] records six cases. The ages ranged from 26 to 46 years, five occurring in women, and one in a man. Five of the cysts affected the right, and one the left side. One was associated with double ureter and appeared to be congenital, while the remaining five cases were acquired, one being secondary to a uretero-vesical anastomosis, one to inflammatory changes round the ureteral orifice secondary to tuberculosis, one accompanied a calculous pyonephrosis, one followed the passage of two stones, and one was secondary to a healed *Bacillus coli* ulcer. Two of the cysts were large, about the size of a cherry, and one the size of an almond. The orifice of the ureter was situated at the tip of the cyst in three cases, toward the mid-line in one, and at the outer and upper part of the cyst in two. In one case examined microscopically, the wall consisted of two mucous layers, bladder and ureter, with an intervening connective-tissue and muscular layer. In the second case examined microscopically there was no muscular fibre between the two layers. In all the cases there were increased frequency of micturition and pain; in one there were symptoms of obstruction, and at one time complete retention. In three there was pyonephrosis and in one hydronephrosis, of the corresponding kidney. In two cases the cyst was incised under the guidance of the cystoscope, two

underwent nephrectomy, two remained untreated, and one passed from observation.

Ureteral Calculus.—Judd[5] used a median vertical incision extending from the symphysis to the umbilicus. The bladder was raised and drawn aside, and the ureter exposed in its pelvic course. Collinson[6] describes four cases, one of which formed a complete cast of the ureter. The choice of operation in calculi lying in the pelvic portion of the ureter lies between the perineal, the iliac extraperitoneal, the transperitoneal, or a combination of the last two. The advantages of the transperitoneal, according to the author, are the ease with which the whole length of both ureters can be palpated, and the amount of room and good illumination of the operation field afforded. It is useful both for diagnosis and the removal of bilateral ureteral calculi. The advantage of the extraperitoneal incision is the small amount of leakage, even though suture of the wound in the ureter is impossible. The author believes that suture of the ureter is unnecessary, and without it there is less likely to be subsequent stricture.

REFERENCES.—[1]*Rev. de Gyn.* 1914, 387; [2]*Jour. Amer. Med. Assoc.* 1913, ii, 1694; [3]*Ibid.* i, 1691; [4]*Ibid.* 1685; [5]*Ann. Surg.* 1914, i, 393; [6]*Lancet*, 1913, ii, 1456.

URETHRA, DISEASES OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Benign Tumours of the Urethra.—Randall[1] divides these into (*a*) fibromas, (*b*) myomas, (*c*) cysts, (*d*) polyps. The word polyp covers "the entire group of benign pedunculated or sessile intra-urethral proliferations not included in the other classes." The author confines his attention to the benign polyps of the male urethra, and describes three types: (1) A pure type or benign fibrous polyp; (2) Villous or papillomatous type or benign villous polyp; (3) Glandular type or benign glandular polyp.

1. The benign fibrous polyp histologically constitutes the analogue of the pure form of caruncle as found in the female. It is probably the most frequent form of benign polyp in the male. The tumours may occur at any part of the urethra. There is a fine network of loose connective tissue supporting thin-walled blood-vessels, but no great vascularity. Localized round-cell infiltration due to a focus of infection may be present, or there is a general cell infiltration throughout the growth. All Randall's cases had a urethral discharge. One had vague radiating pains and frequent nocturnal emissions. Growths in the posterior urethra, especially in the neighbourhood of the colliculus, are associated with sexual disturbances.

2. In the second type of urethral polyp there is papillary proliferation. The stroma is similar to that of the fibrous polyp, but a little denser in structure. The covering epithelium at the base is in many layers of densely packed cuboidal cells, and at the free end there are villous projections covered with cylindrical epithelium. The two cases recorded by the author both occurred in the prostatic urethra, but more typical papillomata are found in the anterior urethra. He

believes that the true papilloma is the rarest of the three types of benign urethral polyp.

3. The benign glandular polyp has a firmer connective-tissue stroma enclosing some muscle tissue, and is covered with epithelium composed of closely packed cuboidal cells with an outer layer of flattened cells. In the substance there are gland acini with smooth round lumina distended with mucoid secretion, lined with one to three layers of epithelial cells, the innermost of which is a high cylindrical type. The most frequent symptom is chronic or recurrent urethral discharge; often there are also sexual disturbances, and sexual neurasthenia may eventually develop.

Cysts of the Prostatic Urethra.—Underhill[2] describes two cases. The surface of this portion of the urethra was covered with cysts from 1 to 2 mm. in diameter, round or oval. No normal mucous membrane was visible, even the colliculus being included in the cystic degeneration. The author concludes that this may follow a preceding inflammation of the part. There are no characteristic symptoms. The local signs are those seen in any long-standing chronic urethritis. The subjective symptoms, if any were present, were those characteristic of the neurasthenia accompanying many of the chronic diseases of the posterior urethra. The only method of diagnosis is by endoscopic examination. Treatment is by **Dilatation**, followed by **Incision** of the urinary cysts under the control of the eye.

Colliculitis.—Wolbarst[3] states that the normal colliculus has no fixed form or type, its appearance depending on the type of examining instrument used. With the more recent type of posterior urethroscope it resembles an enlarged glans clitoris, a small cherry, or a strawberry. It may assume a dome-like shape with the opening of the utricle at the summit, or it may resemble a cone or peak. The general outline remains much the same in disease, except that the smooth walls become turgid and roughened, or replaced by corrugations, excrescences, or cysts. The utricle is usually placed on the summit, but may be found on the anterior or on the posterior wall. The most common condition is an inflammation due to gonococcus infection of the deep urethra and prostate. The author holds that the colliculus should be examined in every case of chronic urethritis, particularly in those where the usual treatment of the prostate and seminal vesicles is unsuccessful. The gonococcus is not always the cause of colliculitis, which may be due to sexual excesses and other causes. The treatment consists almost entirely in the application of **Silver Nitrate** through the urethroscope. It is used in 10 per cent solution, occasionally in 20 per cent, or even solid. **Weak Tincture of Iodine** may be effective in weak solutions, but is very irritating in full strength. Application of the **Galvanocautery** or of the Oudin high-frequency cautery are also used.

References.—[1]*Surg. Gyn. and Obst.* 1913, ii, 548; [2]*Jour. Amer. Med. Assoc.* 1914, i, 265; [3]*Med. Rec.* 1913, ii, 599.

URETHRA, SURGERY OF. (*See also* APPENDIX, SURGERY OF.)

URINARY TRACT, B. COLI INFECTION OF. *Francis D. Boyd, M.D.*
John D. Comrie, M.D.

The question of *pyelitis in children,* especially as regards treatment, was discussed at considerable length in the MEDICAL ANNUAL for 1914, p. 469. Five types of case must be recognized with regard to clinical manifestations, according to Gordon.[1] These are cases (1) of general feverishness without any indication that one system is affected, and cases with (2) cerebral, (3) pulmonary, (4) abdominal, and (5) urinary symptoms.

Secondary infection of the kidney pelvis with the colon bacillus after gonorrhœa or other inflammatory affection of the urinary system is a condition which, according to Bloch,[2] is by no means uncommon. He considers that the infection is an ascending lymphatic process from the bladder, and that the symptoms may be so slight that the acute stage may pass without a diagnosis being made. In these cases a chronic condition leading eventually to a true parenchymatous nephritis is apt to supervene. As to the cause of this complication, he holds that the use of irritating substances to wash out the bladder is often responsible. Very acute cases are amenable to internal medication by **Salol, Kamphosan, Hexal, Borovertin,** etc., while for chronic and subacute cases he recommends flushing out of the kidney pelvis by means of sterile normal salt solution or weak antiseptic fluids.

A new method of treating chronic *B. coli cystitis* has been introduced by Russ,[3] depending on the fact that these organisms during **Electrolysis** in sodium chloride solution move towards the positive pole and are destroyed. A means is thus provided in chronic cystitis of freeing the bladder wall from organisms and allowing the tissues to recover. The method of application is as follows: After voidance of any urine, the patient reclines on a couch, and a broad abdominal belt of layers of lint is passed round the lower part of the trunk. This belt, which carries a core of metallic gauze, is wrung out of warm salt solution before application. Next, a rubber catheter, furnished with several perforations round its eye, is passed into the bladder. Its free end is connected to 8 in. of glass tubing, which in turn is joined by a short length of rubber tubing to a glass funnel, everything being sterilized. A few ounces of the salt solution (2 per cent) are next passed into the bladder, and the glass tubing, after disconnection from the funnel, is clamped a little above the level of the pelvis. A platinum wire 6 to 8 in. long is next passed down the catheter to within 2 in. of its eye. This is connected to the positive and the core of the belt to the negative poles of the electric battery. The fluid in the bladder rises and falls in the glass tubing with the respiratory movements, and its movements serve as an indicator that the catheter eye is within the vesical cavity. A constant current is now gradually turned on to a magnitude of 3 to 5 ma., and is allowed to run for twenty

or thirty minutes. This treatment is applied daily or on alternate days. The author of the method has also used iodic acid of strength 1–1500 as the electrolytic fluid, and has found marked benefit in many cases after a few weeks of treatment.

REFERENCES.—[1]*Brit. Jour. Child. Dis.* 1914, 252; [2]*Deut. med. Woch.* 1914, 276; [3]*Lancet*, 1914, i, 447.

URINE TESTS. *O. C. Gruner, M.D.*

General Analysis.—A number of practical hints in the routine analysis of life insurance examination are given by Muhlberg.[1] He emphasizes the need for having the urine passed in the presence of the medical man, and in the afternoon. The object of the former is to guarantee that the specimen is genuine, of the latter the finding that sugar may be absent in the morning urine. Only the second portion passed is examined, in order that pus cells from chronic urethritis may not escape detection. One or two hyaline casts are allowed, providing the urine is not of low specific gravity. Sugar is invariably tested for by the fermentation test.

Albumin.—Teuscher[2] advocates the use of tablets of ½ gram of sulphosalicylic acid. One tablet is dissolved in 2·5 c.c. urine. It is recommended for 'military sanitary' work.

Blood.—Knaack[3] gives the following test. The urine is shaken with ether. Allow to stand. The pigment and red cells will accumulate at the boundary zone. Now add the ordinary reagent of mixed benzidin and hydrogen peroxide. A blue colour will appear at the line of demarcation referred to.

Tests for Sugar.—A modification of Benedict's method is given by Weinberger[4] in order to obtain a better end-reaction in urines with a low sugar content. Ten grams of calcium carbonate are added before boiling the alkaline Benedict solution. The insoluble snow-white calcium carbonate obliterates all colour except the blue of the copper solution.

Parnell[5] recommends the estimation of sugar by Moore's test (liquor potassæ), the colour being compared with coloured glass slips. Dimmock[6] also recommends a colorimetric method. In this case a solution of potassium carbonate is employed in place of the caustic potash. The result is compared with the colour of a solution of glucose which is prepared each time. The amount of sugar is deduced from the amount of water which has to be added to bring the colour identical in the two solutions.

Chlorides.—A simple method of analysis is given by Strauss.[7] A tube is prepared after the model of the Esbach albuminometer tube. A solution of silver nitrate (17·5 grams per litre) containing ferric sulphate and nitric acid is poured into the tube to a mark A, then urine to a mark U. A 1–20 normal solution of ammonium sulphocyanide is carefully added till a permanent orange colour results. The amount of chlorides is read off at the upper limit of the mixture in the tube.

Acetone.—A delicate test first described by Rosenthal is recommended by Muhlberg.[1] Ten c.c. of urine are treated with about 1 gram of solid caustic soda. Without waiting for it to dissolve, 10 or 12 drops of 10 per cent solution of salicyl aldehyde in absolute alcohol are added. The mixture is heated to 70° C. If acetone be present, a marked purple-red colour develops at the zone of contact. The sensitiveness is believed to be very great. Muhlberg dilutes the urine to a specific gravity of about 1010 before using the test.

Cervello and Girgenti[8] estimate acetone in urine by a fractional distillation method. The distillate is collected in 4-c.c. quantities in a series of test-tubes, and Lieben's test applied to each successive fraction (Lieben's test is that in which iodoform is produced if acetone be present).

Acidosis Index.—Hart's colorimetric method is recommended by Leith Murray.[9] Two solutions are required : (*a*) Ethyl aceto-acetate 1 c.c., alcohol 25 c.c., distilled water 1 litre ; (*b*) Ferric chloride 100 grams per litre. Into each of two test-tubes put 10 c.c. of (*a*) and 10 c.c. urine. To each add 1 c.c. of (*b*). Dilute the urine tube till the colours match. The acidosis index per litre measures one-tenth of the volume in the tube of urine. To get the index proper, which represents the total acidosis expressed in grams β-oxybutyric acid, multiply above by the number of litres of urine passed in twenty-four hours.

Nitrogen.—Owssiannikowa[10] points out the value of a study of nitrogen-retention in chronic nephritis as a guide to prognosis. The blood and urine require to be analyzed.

Mathison's *ammonia* estimation is referred to by Leith Murray[9] Twenty-five c.c. urine are treated with 15 grams neutral potassium oxalate and 50 c.c. distilled water. Shake for two minutes. Neutralize with decinormal soda, using phenolphthalein as indicator. Add 5 c.c. neutral commercial formalin, and titrate again with decinormal soda till neutral. Each c.c. represents 0·0014 gram.

Amino-acids.—Cammidge[11] advises that the urine of diabetics be examined for amino-acids. Excretion of these bodies often goes parallel with that of the acetone bodies. If the acetone is abundant and the amino-acids are low, the prognosis is good ; if the reverse, the prognosis is bad. It is necessary to be sure the amino-acids are not derived merely from the food. He uses Malfatti's method, which gives the ammonia plus amino-acids, and Folin's, which gives the ammonia only. The difference = amino-acids.

Urea.—Hahn and Saphra[12] estimate the urea as follows : The urine is fermented by means of the urease in a soya bean, and is titrated against decinormal HCl before and after fermentation. The difference, multiplied by 0·003, gives the amount of urea in the number of c.c. urine employed. It must be remembered that the urea content of urine is an index to the amount of nitrogenous food taken by the person (W. Langdon Brown[13]).

Ferments in Urine.—Romagnolo[14] studied the question of *pepsin* and *rennin* in the urine, with a view to ascertaining if there were any

means of diagnosis of gastric cancer hereby. However, the results are inconstant. The ferments are absent in gastric-cancer cases, but they may not be present in other conditions, even in health. They are much increased during pregnancy.

Urobilin.—A new apparatus, devised by Berlin, was shown at the Aerzt. Verein zu Marburg.[15] The flask shown in the figure (*Fig.* 96) receives some glass pearls, to prevent milkiness developing in the mixture subsequently formed. Chloroform is now poured in until it covers the end of the siphon tube. Urine is poured in until the siphonage of chloroform begins. The receiver is warmed in a water-bath till the chloroform boils, when the vapour makes its way into the neck of the distilling flask. A condenser is now attached above. The apparatus automatically circulates the chloroform, just as happens with the Soxhlet extraction apparatus, and ultimately a richly-coloured distillate is obtained. Different sizes of apparatus can be utilized. [While the apparatus is to be obtained ready-made in Germany, this, like all the other appliances mentioned here, can be easily constructed in this country by a laboratory glass-blower.—O. C. G.]

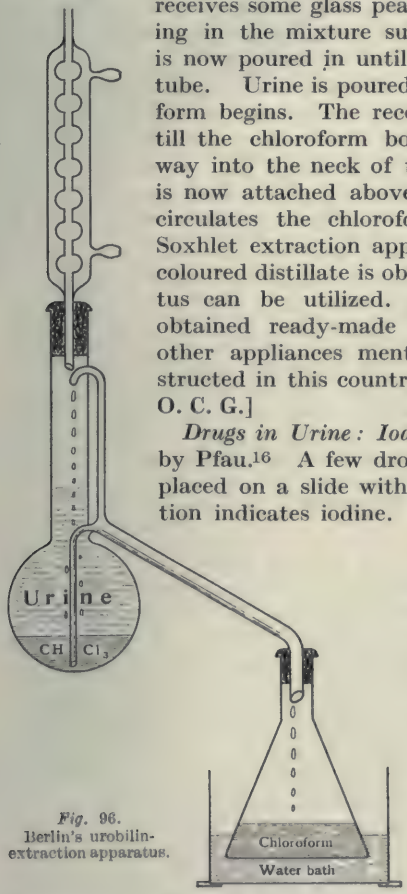

Fig. 96.
Berlin's urobilin-extraction apparatus.

Drugs in Urine: Iodine.—Losser's method is advised by Pfau.[16] A few drops of acidified (acetic) urine are placed on a slide with some calomel. A yellow coloration indicates iodine. If the colour appears instantly, there is 0·1 per cent; if in thirty seconds, 0·01 per cent. If only 0·005 per cent be present, the reaction fails. Albumin and sugar do not affect the test.

Hexamethylenetetramine.—Gross[17] gives the following: Add a quarter to a third the volume of urine of 10 per cent acetic or hydrochloric acid. Then add 7 per cent sublimate, drop by drop. A dense powdery deposit (distinction from protein) means the presence of the drug.

Cytology.—B. G. R. Williams[18] uses Sudan III to detect fat granules in cells in urinary sediments, in order to distinguish pus cells from tubule cells, the two being otherwise very similar.

Bacilluria.—In a series of cases of pyelocystitis of infants, *B. coli* was found the most common type of organism by Kowitz.[19] The next most common was *B. paracoli*, and the next *B. lactis aerogenes.*

Guerin and Thiry[20] show that *sarcinæ* may occur habitually in the urine without causing any symptoms of disease. The species is *S. lutea.*

Tubercle Bacilli.—An agglutination method is given by Lucas.[21] To a given quantity of urine (100 to 125 c.c.), Marmorek's serum is added in the proportion of 2 drops to 10 c.c. Alcohol is added till the specific gravity is 0·999. Shake well. In twenty-four hours 30 c.c. are withdrawn from the bottom. If phosphates have come down, clear with acetic acid. If urates, warm gently. If pus, add a drop of caustic soda for each c.c. of pus. Now centrifuge for half an hour and stain the deposit for tubercle bacilli as usual. Lucas strongly recommends this method for difficult cases.

Tuberculosis.—The Moriz-Weiss Reaction.—One volume of urine is diluted with two volumes of water, and equal parts are put into two test-tubes. To one add three drops of 0·1 per cent potassium permanganate. A yellow colour appears if the prognosis is bad. The test solution must be made up fresh each time. If this reaction comes off repeatedly, its verdict may be trusted (Vitry,[22] Coffin[23]).

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URTICARIA: ITS RELATION TO PURPURA. (*See* Purpura.)

URTICARIA PIGMENTOSA. *E. Graham Little, M.D., F.R.C.P.*

Kerl[1] regards this not as a disease *sui generis*, but merely an association of two factors, urticaria with pigmentation, types being created according as these elements predominate. He would include, for example, chronic urticaria with secondary pigmentation, urticaria perstans, and even urticaria produced by external agencies, provided the degree of pigmentation was sufficient to deserve attention. This view is diametrically opposed to the more general conception, which has tended to regard urticaria pigmentosa as a disease approximating to congenital tumours. By this latter view the urticarial factor is of quite secondary importance, and there is much corroboration of this, inasmuch as clinical records show a very large proportion of cases described as urticaria pigmentosa in which itching was entirely absent or of negligible degree. *Plate LX* is from a remarkable case of the nodular variety of urticaria pigmentosa shown by Graham Little at the International Congress of Medicine, 1913. The patient was a young girl who had had the affection since early infancy. The colour of the lesions was almost suggestive of xanthoma, and this was an alternative diagnosis. Histological examination had not been permitted.

Reference.—[1]*Archiv. f. Dermat. u. Syph.* 1913, cxviii.

PLATE LX.

URTICARIA PIGMENTOSA (NODULAR VARIETY)

F. Graham Little, M.D.

UTERUS, DISEASES OF. *Bryden Glendining, M.S., F.R.C.S.*

Cancer of the Uterus.—(See also below, *Hysterotomy*). Wilson[1] gives an exceedingly frank record of his own results in the operative treatment of uterine cancer, and also analyses and discusses the results of other operators. He shows how, during the last few years, the operability rate has risen from 25 to 60 per cent, and the absolute cures from 2 to 19 per cent of all cases seen, including in this latter figure cases which were inoperable. The article is an accurate review of the results of operative treatment at the present day.

Farrar Cobb[2] describes in some detail the results in 367 cases treated at the Massachusetts Hospital. The majority (73·8 per cent) were condemned as inoperable, so that the operation cases were certainly selected. It is of interest to note that of three cases condemned as inoperable by other men but operated on by Farrar Cobb, two were alive and free from growth five years after operation, and the third case lived two years after operation. Another interesting case was one in which the ureter was cut out of the growth in which it was embedded, and yet the patient was free from growth thirteen years later.

Cancer in the cervical stump left after supra-vaginal hysterectomy is rare ; but Leonard,[3] in reviewing the literature on the subject, compiles a table of 36 cases fully reported. In 16, the growth developed so recently after supra-vaginal hysterectomy that it was reasonable to suppose that there was co-existing malignant disease at the time of operation. It is obvious that the question for solution is, whether the number of cases of malignant growth of the cervix stump is sufficient to justify the general adoption of total hysterectomy as a routine procedure. If the number is considered relatively to that of supra-vaginal hysterectomies, it will at once be evident that the percentage of cancerous stumps is very small. Now the mortality from this cause plus the mortality (2·26 per cent) of subtotal hysterectomy, are together less than the deaths which occur after the operation of total hysterectomy (6·6 per cent), so that the supra-vaginal operation cannot at the present day be supplanted on the plea of liability to cancer in the stump.

Bumm[4] makes an important contribution to our knowledge of the action of **Radium** in cancer of the cervix ; the paper contains detailed reports of six cases in which, after a variable period of irradiation, he was able, either by operation or by the accident of death from some intercurrent malady, to obtain the uterus and appendages. In three of these, minute metastatic nodules might be detected by the naked eye, deep in the cervix or the lymphatic tract, but in the second series of three cases it was impossible to detect any abnormality by this means. Nevertheless, by careful microscopical examination it was in every case possible to recognize, in isolated points, a few cancer cells either in the deeper portions of the cervix, when they showed evidence of degenerative changes, or in the broad ligament and the regions of lymphatic drain.

These cases serve to illustrate at one and the same time, both the success and failure of the irradiation treatment. The success consists in destroying all malignant cells within the effective range of the penetrating rays, with the result that an apparent cure is seen which must yet face the test of time, and also of rendering movable and eradicable, cases which otherwise seemed inoperable. The failure lies in the limited range of the rays, by which a metastatic nodule entirely escapes treatment, so that any cells already in the broad ligament at the moment of treatment are likely to continue to develop in the future.

Degrais and Bellot,[5] from their experience gained in the Radium Laboratory, Paris, consider the clinical and histological side of the action of radium in uterine cancer. The following are some of the conclusions at which they arrive. Radium in some cases so modifies the neoplasm that it may become operable, and they think that vaginal irradiation should be adopted as a routine after every case of ablation of the cancerous uterus. In spite of the immense amount of work done and the number of cases treated, they have as yet been unable to formulate any statistics of results, owing to the fact that cases differ so much. Excluding cases which have deeply involved the pelvic tissues, and those in which extension to the bladder or rectum make any attempt at complete treatment impossible, they find that radium invariably relieves all the distressing symptoms of hæmorrhage, discharge, and offensive smell.

They also point out a few manifestations which commonly follow the application of radium. (1) Nausea results in certain cases in vomiting, but soon passes off. (2) During the following days the patients may complain of marked prostration and become very depressed, so much so that one is tempted to relinquish the treatment. (3) In ten to fifteen days more remote effects follow in connection with the bladder and rectum, when there is frequent desire to micturate and defæcate as well as the emission of muco-membranes. In advanced cases, where the growth involves the rectum or bladder, there is a marked tendency to the development of a fistulous opening. They conclude with the statement that radium is at present only a palliative measure, and not to be relied upon to effect a cure.

Schauta[6] records his results with radium and mesothorium. The ill effects are vesical and rectal fistulæ, and in two cases there was hæmorrhage. The treatment is contra-indicated when the growths have invaded the bladder or rectum. It is otherwise indicated in non-operable and in advanced cases, before and after operation ; the best procedure is perhaps a vaginal hysterectomy followed by radium treatment. Radium has an action much greater than mesothorium.

Faure[7] draws attention to the dense character of the fibrosis resulting after radium treatment. It is of importance in those cases where irradiation has so far improved the condition that operation is considered possible. When operating, it is often found that the ureters are buried in dense tissues from which they are only cleared with the

greatest difficulty and considerable oozing. Likewise the bladder wall is intimately fused with the cervix, and is often torn.

Cheron and Duval[8] insist that massive doses of radium should be employed. They have only treated inoperable cases, and do not claim cures, although one case dying fifteen months after treatment, was apparently cured. (*See also pp.* 66, 67 ; and for **X-Ray** treatment in certain types of cancer, *p.* 63.)

Fibroids of the Uterus.—The greater portion of the year's literature deals with the effect of radiation upon fibroids. Thus Krönig[9] advises **Röntgen Treatment** for myomata in all cases over 40 years of age, as being preferable because of the absence of any fatal results ; also in cases of weakness following prolonged hæmorrhage, and in cardiac lesions. Its disadvantages are that the greater expense involved and the long time required, which according to his methods means six to eight treatments during a period of three or four months. In younger women, where it is desirable to preserve fertility and menstruation, recourse must still be had to enucleation and other operative procedures.

The dangers as he sees them are : (1) Uncertainty of diagnosis—especially the probability of an ovarian growth being mistaken for a fibroid ; (2) Co-existence of malignant growths or sarcomatous degeneration associated with the myomata. He has treated a series of 350 cases at Freiburg with success, as far as stoppage of the hæmorrhage and apparent reduction in size of the tumour are to be taken as evidence of cure.

Marck[10] adopts the method of huge dosage at each sitting, and repeated three or four times. His results in 16 cases are, 9 cured, 4 better, and 3 unimproved. In only three cases was a diminution in volume determined, and in only one was the shrinkage to less than one-half the original size.

Agnes Savill[11] records 3 cases, in 1 of which the treatment was carried on for eighteen months, and at the end of three years there was little diminution in size of the tumour. She used small doses, and a dermatitis appears to have developed in all three cases at one time or another, although only transitory.

Edgar Birdsall,[12] in recording details of two cases, gives the statistical figures of 667 cases collected by Holding, with the result that 56 per cent were considered as cured, 31 per cent improved, 11 per cent unimproved, and 1 per cent lapsed from treatment. The whole result of treatment appears to be an atrophic effect upon the ovarian cells, causing cessation of menstruation and, in the majority of cases, all the typical climacteric symptoms. Then, after cessation of treatment and a varying period of time, the tumour diminishes in volume.

H. Geist[13] reports 12 cases of sarcoma in 250 cases of fibroids, and insists upon the impossibility of diagnosing sarcomatous change clinically, and consequently the risks that are incurred in *x*-ray treatment of fibroids, if generally adopted.

There is an important communication by Kelly and Burnam,[14] in

which extraordinarily good results are reported from **Radium** treatment in various uterine conditions. They treated 21 cases, with only 1 failure in the whole series. The patients apparently suffer from nausea for twenty-four hours after treatment, abdominal tenderness for ten days to three weeks, and some have a leucorrhœal discharge for a few weeks. In one case following treatment, an inflammatory process was lighted up and a pelvic abscess formed. The effect on hæmorrhage in the series of 21 cases is to be gathered from the following figures. In 16 cases there was complete amenorrhœa within a varying period of from one to several months; in 1 case the treatment was too recent, and in 2 cases there was re-establishment of normal menstruation, with disappearance of the fibroid tumours. It is of these two cases that the authors are particularly proud, as offering examples of ideal results to be obtained with suitable medication. In one case the treatment as regards the hæmorrhage was a failure. The tumour is said to have disappeared in 9 cases of the series, reduced to one-half or less in 9, and remained of the same size in 1 case. With intense radiation of the tumours the reduction in size is rapid. The authors employ large doses over a short period to obtain the best results.

Uterine Hæmorrhage.—Beckwith Whitehouse,[15] in his Hunterian lecture, takes as his subject the physiology and pathology of uterine hæmorrhages. In the control of the normal menstrual hæmorrhage there are three factors: (1) The effect of the uterine muscular contraction in limiting the supply of blood flowing to the endometrium; (2) The action of a hormone or hormones (ovarian) producing capillary dilatation *in utero*; (3) The biochemical function of the endometrium itself. One physiological fact brought forth is that with the normal healthy endometrium clotting always takes place within the uterine cavity. This he deduces from fluid collected from the interior of the uterus during menstruation, which at once clotted. Now if this were so, it would be expected that menstrual fluid and the fluid from a case of hæmatocolpos would always contain clots; but such is not the case. He has, however, discovered the presence of some thrombolytic enzyme present in the uterine secretion, which within a certain period is capable of causing resolution of the already formed clot. Hence he thinks it necessary to suggest the presence of a thrombolysin in the normal menstrual fluid. Concerning pathological hæmorrhages, figures are given showing the relative frequency of menorrhagia in various pelvic conditions. For instance, the cause of the menorrhagia was located in some pathological condition of the uterus in 51 per cent of the cases, and in the adnexa in 30 per cent.

In the treatment of uterine hæmorrhages, he discusses the value of curettage, and believes that except in certain types of endometritis, it is valueless; it is often useful as a means of diagnosis. In the hæmorrhages of the menopause, he applies fibrin ferment sold under the name of '**Coagulose,**' with beneficial results.

In cases of bleeding due to hyperplasia of the endometrium, he

recommends curettage in the first instance; this failing, he then employs partial oophorectomy, and finds it acts admirably. In fibrosis of the uterus, hysterectomy remains the only treatment.

Deaver[16] insists that the treatment of hæmorrhage in young girls should be in the first instance restricted to rest, baths, catharsis, and (with a low calcium index) the administration of calcium salts; also that all local treatment, especially douches, examinations, curettage, etc, is distinctly contra-indicated. He notes that women doctors are specially reprehensible in their predilection for excessive local treatment.

Kelly and Burnam[14] publish some important results following the application of **Radium** for various uterine conditions. The results, if substantiated in the near future, should lead to a revolution in gynæcological treatment. The conditions treated are arranged in four groups. The last group concerns myomata, and has already been summarized (*vide supra*).

Group 1, treats of 8 cases of marked hæmorrhage either intermenstrual or at the period; in these cases there was no pelvic disease on clinical examination, and curettings of the endometrium showed no demonstrable pathological change. The dosage of radium varied from 60 to 260 mgrams applied for varying periods of two to twenty-four hours. In the result 2 cases showed no more bleeding after the first application, 1 case required a second treatment, and the remaining 5 cases showed a normal period at the next month, but subsequently there was complete amenorrhœa. Menopausal symptoms were mild in 3 cases, marked in 1, and absent in 4.

Group 2, relates to cases of hæmorrhage occurring in young women in some of which there was a polypoid endometritis, in others no pathological change. In the 5 cases treated, the ages varied from 13 to 23 years, and all but one were previously curetted. The dosage of radium varied from 12 to 400 mgrams for five to twenty-four hours. In 3 cases the menses have returned to normal type; in 1 case there was two months' amenorrhœa, then menstruation became re-established, a little irregularly but never excessively, and in 1 case in which there had been applications through the abdominal wall there was complete amenorrhœa with distinct menopausal symptoms.

Group 3, includes cases of polypoid endometritis. Five cases were treated and received doses varying from 30 to 100 mgrams for seven to twenty hours. Of these, 1 required hysterectomy in order to check the hæmorrhage, five days after the first application, while in the remaining 4 cases bleeding stopped and was followed by amenorrhœa in all cases, menopausal symptoms being present in one-half.

Pfahler,[17] in a communication to the same meeting, discusses the advantages claimed for radiation methods, among which are the following: painlessness, absence of operative shock, preservation (he thinks), to a certain extent, of internal secretions which are lost in a complete oophorectomy, no need for confinement to hospital, and finally, the menopause is brought on gradually. As a rule,

amenorrhœa follows treatment within a couple of months ; the first period is usually excessive, while in the second the loss is small. In 75 per cent the tumour disappears.

In the discussion following these communications, the difficulties of diagnosis and also the uncertainty of results as compared with operative treatment in myomata, were insisted upon.

McGlinn[18] observed that Kelly's results were simply amazing when compared with the results of others, as according to results obtained in the European clinics, but 5 per cent of cases showed disappearance of the tumours. Therefore 95 per cent of tumours are in a condition to undergo degeneration. Shoemaker drew attention to the fact that all the cases of endometritis reported cured by Kelly were curetted before treatment by radium ; a procedure in itself sufficient to result in curing many of these cases.

Hysterotomy.—The use of this operation in a further series of 25 cases is now recorded by Deaver.[19] He has been led to employ incision of the uterus, because dilatation and curettage have so often proved failures as a means of diagnosis, either because the endometrial scrapings escape with the blood, or because small initial lesions are overlooked. By means of hysterotomy he has been able to treat early cases of malignant disease, and with more certainty of cure than by adopting the accepted methods of diagnosis. He instances a very early carcinoma originating in the extreme left corner which was discovered by this measure. In the absence of any very definite lesion as a cause of the symptoms, it is still possible to curette more efficiently by this method than through the dilated cervix, as the whole interior is seen while being curetted.

The mortality from this operation, which has been performed in 40 cases to date, is *nil*.

Varicocele of the Broad Ligament.—The more general application of surgical measures as a curative agent in abdominal lesions, or even as a means of diagnosis, has led to the recognition of a definite clinical condition which is designated varicocele of the broad ligament. It is characterized by the presence of dilated, tortuous veins occupying one or both broad ligaments. Little is known of the pathology of the condition, but there seems little doubt that pregnancy is indirectly responsible, and that the veins physiologically dilated in that state, fail to involute during the puerperium, either from a faulty position or owing to some cause raising the intra-abdominal tension. Darnall[20] records six cases in which operation proved successful in relieving the pain. He describes the symptoms as those of pain aggravated on standing or walking, and decidedly worse before the onset of each period. It is referred to the pelvis and back, and is of a dull aching character. On examination, there is seldom any evidence of a pelvic lesion, and the complete absence of physical signs of disease usually leads to a diagnosis of neurosis.

The treatment should be **Excision** of the veins between two ligatures with suture of the cut broad ligament.

Post-operative Results of Trachelorrhaphy.—An interesting article comparing the merits of this operation with that of amputation of the cervix, the different results, and their effect on fertility, is contributed by Leonard.[21] Among his conclusions are the following. A simple laceration is best cured by trachelorrhaphy, but in the presence of hyperplasia of the cervical glands and a marked endocervicitis, an amputation of the cervix is distinctly indicated in order to obtain a permanent cure.

Both operations, performed in properly selected cases for the respective conditions, give good results, as represented by 95 per cent of general cures. Fertility is more likely after simple repair of the cervix than after amputation. The operation of trachelorrhaphy does not interfere with the course of pregnancy ; after amputation the incidence of abortion and especially of premature labour, is enormously increased. Fertility is much more likely to follow after simple repair than after amputation ; in the latter operation there is a certain risk of hæmorrhage (in about 5 per cent of cases) during convalescence.

Facts as to radiographic appearances of calcifying fibroids are given on *p.* 58.

References.—[1]*Lancet*, 1914, ii, 318 ; [2]*Boston Med. and Surg. Jour.* 1914, i, 861 ; [3]*Ann. Surg.* 1913, i, 373 ; [4]*Berl. klin. Woch.* 1914, 193 ; [5]*Canad. Pract. and Rev.* 1914, 334 ; [6]*Monats. f. Geb. u. Gyn.* Bd. 28, Hft. 5 ; [7]*Bull. de la Soc. d'Obst. et de Gyn.* 1913, May ; [8]*La Gynécol.* 1913, Oct. 10 ; [9]*Surg. Gyn. and Obst.* 1914, i, 529 ; [10]*Wien. klin. Woch.* 1914, 745 ; [11]*Brit. Med. Jour.* 1913, ii, 919 ; [12]*Med. Rec.* 1914, i, 892 ; [13]*Amer. Jour. Obst.* 1914, i, 766 ; [14]*Jour. Amer. Med. Assoc.* 1914, ii, 622 ; [15]*Lancet*, 1914, i, 877 and 951 ; [16]*Jour. Amer. Med. Assoc.* 1913, ii, 672 ; [17]*Ibid.* 1914, ii, 628 ; [18]*Ibid.* 633 ; [19]*Ibid.* 292 ; [20]*Ibid.* 391 ; [21]*Surg. Gyn. and Obst.* 1914, i, 35.

UTERUS, DISPLACEMENTS OF. *Bryden Glendining, M.S., F.R.C.S.*

Retroversion.—The frequency following confinements is investigated by Austin Flint,[1] who finds that roughly about 20 per cent of all women show retroversions within the six weeks following labour, unless special precautions are taken.

Among the etiological factors must be reckoned the great movability of the uterus and vagina after labour ; and also the great weight of the parturient uterus. In 37 cases of retroversion, 25 were in primiparæ, which indicates a greater relaxation of the uterine supports in the first labour. Gayler[2] maintains that the dorsal position during the puerperium is responsible for the majority of retroversions, especially if persisted in until the tenth or twelfth day, when the uterus is again small.

As preventive measures, Flint[1] discards the binder on the tenth day, gets the patients in the knee-chest position for five minutes twice daily, and insists on routine attempts at micturition. The treatment recommended is **Douching,** the insertion of **Tampons of Glycerotannin,** and no pessary for the first six weeks. In this way he has cured 18 out of 21 cases.

The remaining articles nearly all relate to the operative procedure which gives the best results. From these papers it would appear

that the most popular procedure is that in which the round ligaments are shortened by opening the abdomen, and bringing them out through a hole in the rectus muscle of each side about half an inch from the mid-line. This method, with the lacing of the two ligaments together in the mid-line, is strongly advocated by Roubier,[3] although he admits that occasionally an intestinal strangulation may occur round the looped-round ligament.

Polak[4] reports the results in 400 cases, where he had performed the Baldy-Webster operation—that of passing the round ligament through the broad ligament of its own side and uniting them behind to the uterus. He has traced 376 of the cases, and of this number only 160 have complete relief from all symptoms. In 174 cases there were complications and disappointments, with relapses to retroversion, in 32 cases carrying the ovaries down also ; another 30 cases are now wearing pessaries. Few cases have lateral versions of the uterus, but 16 cases have prolapsed ovaries, and 26 cases have had thrombosis of the pelvic veins, which has extended to the femoral and saphenous veins. At the discussion which followed the paper, it seemed to be recognized that the operation was limited in its applicability to a few cases in which the uterus was small.

Stitching the uterus to the abdominal wall forms the surest method of bringing the uterus forward, and is extensively used by Giles,[5] but it is generally thought that it should be restricted to cases which have passed the child-bearing age. Harris[6] recognizes that dystocia during labour occurs in 1·5 per cent of cases after ventrifixation.

Worrall[7] is of opinion that all backward displacements sooner or later give rise to symptoms and require treatment. The use of pessaries is to be condemned as never effective, often aggravating the condition, and holding back secretions which then become infected. He has sutured the round ligaments behind the uterus after passing each through the broad ligament of that side in 10 cases, and has had one failure. It is thought that the round ligaments interfere with the venous return of the blood from the uterus. The extra-peritoneal (Alexander's) operation he has done 72 times, with 7 failures.

In all, 334 ventro-suspensions were performed, either primarily or in the course of operation for some other condition, and curative results obtained in 90 per cent.

Prolapse.—Bonney[8] makes an important contribution, in which he insists upon the proper recognition of all the factors which come into action in preventing prolapse. He remarks that the rule is to diagnose a condition as prolapse, and apply a routine operative procedure irrespective of the fact that each variety, of which he recognizes at least seven, requires its own special operation. In a generalized description of the sustentacular apparatus of the female genital tract, the supports are arranged in three groups : an upper, containing all the structures which go to the body of the uterus, lesions in this group giving rise to displacements of the uterus ; a middle group supporting the cervix, relaxation of which gives rise to inversion of

the vagina, usually recognized as early prolapse ; a lower group in relation to the vaginal outlet and giving rise, when relaxed, to eversion of the vagina, a condition to which is usually applied the term rectocele. It is obvious that any combination of these groups may be affected, and even all three when a condition of procidentia exists.

The correct treatment is, when possible, a restoration of the ligamentary structures, so that functionally there is a reproduction of the normal. If, however, such restoration is not possible, then some operation must be employed which substitutes supports of other kinds ; these supports replacing the normal ligaments must be mechanically efficient and sound. The correct treatment of each variety of prolapse is indicated by the above-mentioned principles.

After discussing the causes and the palliative treatment in conditions of genital prolapse, Lockyer[9] proceeds to describe the operation which he employs as a routine in the treatment of cystocele. The technical details are rendered clear by a series of good illustrations. He reflects the base of the bladder from the cervix and anterior wall of the vagina, commencing the reflection in the region of the cervix. When the base of the bladder is free, he sutures through the connective tissues in the base of the urethra, and also through the anterior surface of the cervix as high as possible under the peritoneal reflection, and when these are drawn tight the bladder disappears. The edges of the levatores ani and the aponeuroses are then sought and sutured together by three mattress sutures. The cervix, if hypertrophied, is next removed by a modified circular amputation. The vaginal edges are finally sutured. He completes with a thorough colpoperineorrhaphy, and if the fundus of the uterus is upright, and there is no evidence of adhesions, he does not proceed to any further operative treatment, such as ventre-suspension.

At the annual session of the American Medical Association, a series of papers was read on the best methods of treating cases of prolapse. Montgomery[10] advocated, in all marked cases, a total extirpation of the uterus, with careful union of the pelvic floor, so that the vaginal vault and the two broad ligaments were all intentionally brought together in the mid-line, and the free edges of the levatores ani sutured. The advantages claimed for the operation are that the diseased distorted uterus, with its increased weight, are removed, prolapse of both rectum and bladder is prevented, inasmuch as they are supported on the upper surface of the broad ligaments, and the normal length of the vagina is maintained.

Martin[11] insists upon the importance of keeping the cervix in the sacrum, and advocates for all marked cases the anterior interposition operation, in which the fundus uteri is made to support the bladder and form part of the pelvic diaphragm. With this operation it is essential to do a thorough perineorrhaphy, and much depends on the form of this operation as to results.

The anatomy and surgical importance of the utero-sacral ligaments are considered in a paper by Somers and Blaisdell.[12] The

muscle fibres and the fibro-elastic tissues present in these structures are held to form a very important element in the suspension of the uterus and cervix in its pelvic position. The authors discuss their accessibility from the surgical point of view, and think that these ligaments should receive more consideration than they are allotted at present in the treatment of displacements. The operation of exposing and shortening them is both practicable and successful; it is particularly indicated when retroversion or prolapse is accompanied by a relaxed vaginal vault.

In the discussion which followed, and in which a great many took part, the outstanding fact was the variety of views as to what support or supports were responsible for the position of the uterus, and consequently the operative measures necessary in order to reconstitute the relaxed or ruptured tissues. For some, the pelvic fascia and tissues in front of the cervix and surrounding the base of the bladder were of great importance, while for others the broad ligaments and utero-sacral ligaments were respectively to be considered of more value. Opinion was equally divided on the question of operative measures, except that for the majority of operators, a thorough and sound perineorrhaphy was essential, in addition to the operations more especially done to combat cystocele and vaginal inversion. Against the anterior interposition operation for cystocele, it was pointed out, the uterine cavity becomes wholly inaccessible.

Inversion.—Nigel Stalk[13] publishes the details of a case of acute puerperal inversion of the uterus, which followed upon labour, when the placenta was being expressed. The patient died within fifteen minutes, from shock. He investigates the frequency and mortality, and quotes Thorn, who, from the literature of the last thirty years, collected 437 cases with a death-rate averaging 25 per cent, but much higher in acute inversions than in chronic; in the latter, septic infection is the chief danger. In 83 cases due to intra-uterine tumours, the peritoneal cavity was opened during the manipulations of attempted reposition in 12 instances.

The rules to be observed with acute puerperal inversions are: (1) If there is no shock, replace the uterus at once if possible; (2) In the presence of shock, use measures to combat it, but do not increase it by attempts to replace; (3) When shock has passed off, try gentle taxis; if this fails, operate, removing the uterus if necessary.

Crossen[14] describes a case of inversion which could not be replaced, and in which he performed a vaginal hysterotomy after separating the bladder. Having turned the uterus into its normal position, he pared away a portion of the wall, and sutured the uterus again. Thus successfully conserving the uterus and curing the inversion.

REFERENCES.—[1]*Amer. Jour. Obst.* 1914, ii, 1; [2]*Jour. Amer. Med. Assoc.* 1914, i, 607; [3]*Rev. de Gynœcol.* 1914, 81; [4]*Jour. Amer. Med. Assoc.* 1913, ii, 1430; [5]*Brit. Med. Jour.* 1913, ii, 984; [6]*Austral. Med. Gaz.* 1914, 61; [7]*Brit. Jour. Obst. and Gyn. Brit. Emp.* 1914, i, 277; [8]*Ibid.* i, 328; [9]*Pract.* 1913, ii, 755; [10]*Jour. Amer. Med. Assoc.* 1913, ii, 1245; [11]*Ibid.* 1246; [12]*Ibid.* 1247; [13]*Med. Rev.* 1914, 47; [14]*Jour. Amer. Med. Assoc.* 1914, i, 1061.

VACCINATION. (*See also* SMALL-POX.) *E. W. Goodall, M.D.*

Eruptions, more or less generalized, following upon vaccination, have long been recognized. They have been divided into three groups: (1) Those which are peculiar to vaccination; (2) Those which are not peculiar to vaccination; and (3) Complications. A. J. Chalmers and W. Byam[1] have put on record eleven cases of a papulo-vesicular eruption in negroes from the Anglo-Egyptian Sudan. The eruption appeared eight or nine days after vaccination. Its appearance was preceded by itching. At first it consisted of dark-coloured macules, which quickly became papules. The distribution was chiefly on the backs of the forearms and hands, the back of the neck, the forehead, face, chest and back. The eruption came out in successive crops, and the number of papules varied from a few dozen to several hundred. Many of the papules became surmounted by small vesicles. From the microscopical appearances of the lesions, and the fact that they appeared eight or nine days after inoculation, the writers conclude that the eruption was of the nature of generalized vaccinia. When the rash came out there was some pyrexia (up to 102°). The eruption lasted for four or five days, and was followed by desquamation.

REFERENCE.—[1]*Jour. Trop. Med. and Hyg.* 1914, 145.

VACCINES. (*See* GONORRHŒA.)

VAGINA, DISEASES OF. *Bryden Glendining, M.S., F.R.C.S.*

Adenomyoma of the Recto-vaginal Wall.—This comparatively rare disease has been receiving a good deal of attention; its recognition and description have been rendered possible in the last few years owing to the advances of surgery which render the removal of the uterus and the upper part of the vagina, together with a piece of the rectal wall, a comparatively safe procedure. Cullen,[1] in reviewing the cases, and adding two of his own, refers to the accurate and well-illustrated case reported by Lockyer before the Royal Society of Medicine. The diagnosis presents considerable difficulty; in the majority of cases, a diagnosis of cancer of the rectum has been made, either clinically or during the course of operation. The only means of distinction lies in recognition of healthy mucosa, overlying the growth in the septum, and freely movable upon it, but this is not likely to be recognized in many instances. A further point which may help, is the frequent association of fibroids in the uterus. With regard to the pathology of the condition, Cullen is of opinion that the growth always arises in Mullerian remnants which, during development have become included in the recto-vaginal wall.

The treatment is surgical removal, which should be a modified panhysterectomy, together with the necessary amount of recto-vaginal septum; care will be necessary in order to free the ureters when removing the tumour. If growth is left behind, it will continue to

proliferate, as in one of the cases recorded, where, following a previous operation, the tumour proliferated, giving rise to severe hæmorrhage, and rendering the patient so weak that she succumbed to a second operation. Nevertheless, the growth is not malignant, and never gives rise to metastatic deposits.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1914, i, 835.

VARICELLA. *E. W. Goodall, M.D.*

SYMPTOMS.—Reginald Miller and J. A. Davidson[1] record a case of weakness of the lower extremities, and tremor of the limbs, head, and tongue occurring in a boy, age 2½ years, during an attack of varicella. They believe the cause to be encephalitis of the cerebello-rubro-spinal system. The patient recovered. In their paper they give a list of the recorded cases of nervous complications of varicella, all of which, however, are rare. Besides encephalitis, the following have been observed: poliomyelitis, peripheral neuritis, herpes zoster, convulsions, optic neuritis, pachymeningitis, neuromyositis, and chorea. The apparent connection of herpes zoster with varicella is interesting. "The cases appear to fall into two groups. In one, an eruption of herpes zoster is rapidly (within twenty-four hours) followed by an ordinary rash of varicella. In the other, a malady which has passed as an attack of herpes has appeared to have been the source of varicella in others."

Two cases of extensive gangrene of the skin and subcutaneous tissues, one of them fatal, have been published by H. C. Storrie,[2] who points out that three classes of cases of gangrenous chickenpox have been described. The first is that in which superficial ecthymatous sores appear; the second is the 'varicella gangrenosa' of Hutchinson; and in the third there is a single but extensive lesion. Storrie's cases seem to have belonged to the last variety.

As varicella had broken out in a somewhat severe form in the Stockholm General Hospital for Children, in August, 1913, C. A. Kling[3] inoculated 31 infants with lymph from varicella vesicles in order to protect them against an attack of the disease. One of these infants, all of whom had been exposed to the infection, caught varicella. Of 64 infants exposed to the infection but not inoculated, 40 were attacked. The inoculation was performed on the child's arm. There was an immediate slight local inflammation, which quickly subsided. On the eighth day from inoculation red papules arose at the site of inoculation, like the papules of ordinary vaccination against small-pox, but smaller. Next day varicella vesicles appeared. In some instances the period between the inoculation and the appearance of the papules was longer than eight—up to thirteen—days. Inoculation was carried on from one child to another successfully, so far as the local results were concerned, to the fifth remove. Many of the children thus inoculated had recently been successfully vaccinated against small-pox. In none was there a generalized eruption of

chicken-pox ; but in 6 of 49 cases inoculated, a scanty papular eruption, with a slight tendency to vesiculation, came out three days afterwards.

REFERENCES.—[1] *Brit. Jour. Child. Dis.* 1914, 15 ; [2]*Ibid.* 62 ; [3]*Berl. klin. Woch.* 1913, 2083.

VARICOSE VEINS. *F. W. Goyder, F.R.C.S.*

Brau-Tapie[1] records ten cases of *congenital varix* of the veins of the lower limb. The condition is not infrequently associated with angioma of various types, from port-wine stain to the cavernous variety. He does not regard these conditions as interdependent, but as separate manifestations of congenital vascular atony. The prognosis and treatment appear to be the same as in the acquired variety.

Schiassi,[2] in a monograph, describes a " new Italian method " of treatment for varicose veins of the lower extremity. He exposes the main trunk at several points, and injects by means of a syringe and cannula a solution of 1 per cent iodine and 1·1 per cent potassium iodide in distilled water, using up to 60 c.c., and washing the vein out from below upwards with the solution. As it does not cause coagulation of the blood, there is no danger if the fluid escapes into the general blood-stream through collaterals. No case of embolism occurred. He does not favour the injection of corrosive or of blood-coagulating materials. Occlusion of the injected veins follows. General anæsthesia is advised. The saphenous vein is exposed near its termination and divided, the central end ligatured, and the peripheral end clamped. Below this point, at suitable places the vein is divided and clamped. After the injection the veins are ligatured.

REFERENCES.—[1]*Arch. Gén. de Chir.* 1914, 26; [2]Bologna: Imprimerie Gamberini-Parmeggiani, 1913.

VERRUGA PERUVIANA. *Leonard Rogers, M.D., F.R.C.P.*

R. P. Strong and four assistants[1] have made a most important investigation of this disease in Peru. After dealing with the previous work done on the subject, they relate their own experience. In the first place, they have come to the conclusion that the skin eruptions known as verruga peruviana constitute a disease distinct from the acute febrile and fatal disease called Oroya fever. The former view, that the fever is an acute manifestation of the local lesions, was largely based on Carrion having died of fever subsequently to inoculating himself with verruga peruviana, but no accurate records of his fever are available. Strong and his fellow-workers have found a parasite in the red blood corpuscles in cases of Oroya fever, very similar to that first described by Barton, but not in the local lesions of verruga peruviana. The local disease can be transmitted to animals by inoculation, but the fever has not yet been so transmitted. The parasite of the fever has been found in both fresh blood and stained specimens, although Barton failed to find them in the former. In fresh blood it is often difficult to see, but with good illumination rounded or

rod-shaped bodies endowed with slow motility can be detected in fresh films on warmed slides. Several organisms may be seen in a single red cell gliding slowly over one another. In fixed and stained specimens the rod-shaped forms are intensely coloured at their ends, and may show reddish granules in a blue body. No cultures could be obtained of the organism, which they regard as protozoal in nature, most closely resembling the *Protista* and the species named *Grahamella* by Brumpt. They propose to call it *Bartonia bacilliformis*.

With regard to verruga peruviana, they conclude that it is a distinct disease differing from frambœsia and syphilis, and affecting the skin and mucous membranes. On inoculation into the testis of a rabbit, it produces a characteristic lesion in from ten to twenty-two days. In dogs and monkeys, skin lesions can be obtained by inoculation ; and in one case the disease was reproduced in man in the same manner with an incubation period of sixteen days. The organism of this disease has not been discovered.

C. H. T. Townsend[2] records the infection of a dog with verruga by the injection of the titrated bodies of twenty female *phlebotomus*, the typical nodular eruption appearing after six days. Bassett-Smith[3] publishes uncoloured illustrations of Barton's bodies stained with Giemsa.

References.—[1]*Jour. Amer. Med. Assoc.* 1913, ii, 1713 ; [2]*Ibid.* 1717 ; [3]*Trans. Soc. Trop. Med.* vii, No. 4, 158.

VESICULÆ SEMINALES.

See p. 58 for details as to the application of **Radiography.** (*See also* Seminal Vesicles.)

VINCENT'S ANGINA. (*See* Pharynx, Diseases of.)

VULVO-VAGINITIS. (*See* Gonorrhœa.)

WARTS. (*See* Corns and Warts.)

WHITE SPOT DISEASE. *E. Graham Little, M.D., F.R.C.P.*

MacKee and Wise[1] review the literature of this somewhat obscure affection, and come to the conclusion that confusion has been caused by comparison of different stages of one malady, and by failure to recognize that two distinct groups of disease have been described under this name. The first group is of the nature of morphœa guttata, the second is of the type of atrophic lichen planus, and cases showing apparent transitions between these groups will ultimately be relegated to one or other of these categories. They report a new case with a singular distribution, on the penis and scrotum. The typical lesion consists of a discrete, sharply circumscribed, circular or oval smooth glistening plaque, about the size of a split pea, and seeming to be imbedded in the skin like a mosaic. Occasionally, the dead white centre characteristic of the manifestation is surrounded by a violaceous border. The margin is usually raised, and the centre

depressed. A summary of the principal cases recorded is given in this paper, and bears witness to the varied clinical appearances which have been grouped under this designation. "White spot disease occurs mostly in females, especially in those of a neurotic temperament (according to Petges, in those with a tuberculous taint). It may occur in childhood or in early and late adult life. Most of the recorded cases were in the third and fourth decade. The disease is essentially chronic in its course, the lesions making their appearance insidiously and developing slowly. Apart from the moderate pruritus, especially in the beginning, subjective symptoms are rare. The areas of predilection are at the base of the neck in front and behind, and the upper portion of the chest and back; but the lesions may appear on the extremities, various portions of the trunk, on the genitals, etc."

Histological examination of the lesions on the penis showed an intense inflammation leading to degeneration in the connective tissue of the upper zone of the corium, followed by hypertrophy of the collagen, diminution of blood-vessels, loss of elastic tissue, and flattening of the interpapillary processes. An exhaustive analysis of the histological data in previously published cases, adds interest to this part of the paper. The second category of cases, to be carefully discriminated from the first, showed more or less close relations with lichen planus, and had a different histology; but in some cases of definite atrophic lichen planus the histology may resemble that of sclerodermia, and so differentiation by histological data alone is not always practicable. Moreover, the histological appearances vary so greatly in different stages of the same disease, that comparison of cases is increasingly difficult. The authors conclude an important paper with the opinion that there is no entity that can be called 'white spot disease'; but they consider that the name should be retained to signify the special form of sclerodermia occurring clinically as white spots, i.e., to include only the first class here described.

Reference.—[1]*Jour. Cutan. Dis.* 1914, 629.

WHOOPING-COUGH. *Frederick Langmead, M.D., F.R.C.P.*

Etiology.—Although Bordet and Gengou described as long ago as 1900 a cocco-bacillus which they consider to be the cause of this disease, their conclusions have not been accepted as indubitable by clinicians generally. The chief evidence for its pathogenicity which they adduced, that of the complement-fixation test, has not been considered sufficient. Mallory[1] has made some further observations. He has found the organisms in large numbers packed between the cilia of the cells lining the trachea and bronchi. Their action appeared to him largely mechanical, interfering with the normal movement of the cilia, and therefore provoking a continual irritation leading to coughing. He injected sputum from acute cases of whooping-cough into the tracheas of a puppy and a rabbit, and found in them also similar changes in the air-passages after death. The value of this

experiment in the case of the dog is lessened by the fact that in dogs suffering from distemper L. J. Rhea has found similar changes.

Diagnosis.—The complement-deviation test has now been added to the means of diagnosis, but it has not usually been considered useful until the disease is well advanced. Bordet himself stated that it could not be obtained in the early stages. Netter and Weil find that the test is constantly positive by the end of the second week of the paroxysmal stage, but were unable to elicit it in the catarrhal stage. Alfred Friedlander and E. A. Wagner,[2] however, have been able by its means to diagnose pertussis in the catarrhal stage in two cases out of three in which it was present. In every one of nine cases the reaction was positive in the first days of the paroxysmal stage. They emphasize the importance of fresh active antigen and serum.

Complications.—The seriousness of whooping-cough is becoming more generally recognized. The mortality, according to Sylvester,[3] is approximately 7 per cent in the United States, where 10,000 deaths from whooping-cough occur annually. He records 8 cases with cerebral or meningeal symptoms, 7 of which were rapidly fatal, whilst the other recovered but remained mentally and physically crippled. From the sudden character of the onset of the meningeal symptoms, which began during, or immediately after, a violent paroxysm, he ascribed them to hæmorrhage. [There was no means of proving it, however, as no autopsies were made, and in two cases, at least, meningitis was shown to be present by lumbar puncture.—F. L.]

Treatment.—**Vaccine** therapy appears to be more in favour for this disease in America than in the British Isles, and the tendency is to give larger doses than formerly. Kelsall[4] has treated 30 cases in this way, the ages of the patients ranging from two months to twelve years. As the usual dosage of from 20,000,000 to 25,000,000 bacilli produced little effect, he increased it to 50,000,000. In his opinion amelioration of the symptoms was secured in every instance. The paroxysms were rendered milder and less frequent, and the duration of the disease in the majority of the cases was shortened. There was a notable absence of complications. One of the cases, however, terminated fatally from bronchopneumonia. Luttinger[5] also treated 10 cases in this way, the initial dose in all but one being 50,000,000 bacilli. The highest dose administered was 250,000,000. In some cases injections were given as often as every twenty-four hours. No local reaction occurred at the site of the inoculation, but sometimes a slight elevation of temperature and an increase in the number and severity of the attacks of whooping were noticed. He also came to the conclusion that the disease was rendered less severe and that its duration was shortened by this means.

The number of drugs advocated for whooping-cough is still being added to. Pauli,[6] basing his conclusion on 6 cases, speaks of the value of **Chineonal.** It appears to have acted chiefly by obtaining more sleep for the patient. The doses he employed varied from 0·05

to 0·2 grams. H. Cramer[7] records good results from the use of **Droserin.**

References.—[1]*Boston Med. and Surg. Jour.* 1913, ii, 575 ; [2]*Jour. Amer. Med. Assoc.* 1914, i, 1008 ; [3]*Boston Med. and Surg. Jour.* 1914, i, 406 ; [4]*Ther. Gaz.* 1914, 14 ; [5]*Med. Rec.* 1913, ii, 1125 ; [6]*Deut. med. Woch.* 1913, 1880 ; [7]*Berl. klin. Woch.* 1913, 2288.

E. W. Goodall, M.D.

Under the heading "An Epidemic Resembling Whooping-cough," Norman C. Carver[1] gives an account of an outbreak, in a boys' school at Surbiton, of an infectious disease in which all the symptoms of whooping-cough were present without the whoop, viz., pyrexia, bronchitis or bronchopneumonia, frequent paroxysmal cough, retching (but rarely vomiting) at the end of the cough, and expectoration of muco-pus. The bronchitis lasted for two or three weeks ; often the cough lasted much longer. In three cases the sputum was examined for micro-organisms. In two, Gram-negative bacilli of the influenza type were found ; in all three the *Micrococcus catarrhalis* and streptococci. Other organisms were also found in one or other of the cases, but not the Bordet-Gengou bacillus.

G. Blake Masson[2] (Downham, Norfolk), H. S. Hall[3] (Abbot's Bromley, Staffs.), and S. J. Ross[4] (Bedford) report similar outbreaks The latter observer states that in his cases **Adrenalin,** given internally, controlled the paroxysms of coughing.

References.—[1]*Brit. Med. Jour.* 1914 i, 700 ; [2]*Ibid.* 837 ; [3]*Ibid.* 891 and 1097 ; [4]*Ibid.* 995 and 1269.

XANTHOMA TUBEROSUM MULTIPLEX.

E. Graham Little, M.D. F.R.C.P.

Knowles[1] contributes a paper and reports a new case, with this title. There are three clinical varieties bearing the name of xanthoma, the relation of which is uncertain. Xanthoma planum, xanthoma tuberosum, and xanthoma diabeticorum are regarded by the majority of writers as different types of the same process. Torok thinks the first two are related, the last a distinct affection. Pollitzer and Unna on histological grounds distinguish xanthoma planum from the other two forms, which are regarded by these authors as similar varieties.

Xanthoma tuberosum is met with in children and adults, in both sexes ; it may be congenital, or may develop in the earlier years of life. Family inheritance seems to be a frequent factor. Jaundice was associated with this form in the adult in 23 of 28 cases reported on by the Pathological Society of London. Histologically, xanthoma is a neoplasm consisting of cells closely resembling endothelium which give a definite reaction of fat. The process is located chiefly in the middle and deeper parts of the corium ; there is an excessive amount of fibrous tissue, of fibroblasts, some of the latter of which also give the fat reaction. The etiology remains obscure. *Plate LXI* was taken from a case of xanthoma tuberosum multiplex in a girl aged 6 years, who had begun to develop the tumours in early childhood. Her

paternal grandfather had died of diabetes at the age of 50. The patient's urine showed no sugar, and her sugar tolerance was normal. Histological examination confirmed the clinical diagnosis, which was unanimously accepted at the late International Congress held in London, where the case was shown by Graham Little. Treatment by freezing with **Carbon Dioxide** effected much improvement.

REFERENCE.—[1]*Jour. Cutan. Dis.* 1914, 288.

YAWS. *Sir Leonard Rogers, M.D., F.R.C.P.*

Philip Harper[1] records his experience of the treatment of yaws with salvarsan in Fiji, where it is a serious cause of mortality and extremely prevalent. Before the introduction of this drug the treatment of the disease was very unsatisfactory, while its ravages much resembled those of syphilis in their protean character. **Salvarsan** rapidly clears up the symptoms, although it is still too early to say if it completely cures the disease. For intramuscular injections he uses a strongly acid solution of salvarsan in sterilized rain-water of a strength of 1–10; and for intravenous injection neosalvarsan in 0·4 per cent sodium chloride. He prefers small doses repeated several times.

E. C. Girling[2] has treated yaws with salvarsan in the Belgian Congo, and reports that in every one of fifty cases recovery has been rapid and complete. The dose was 0·01 gram per kilo weight, although three-fourths of this dosage has also been successful. The pain ceased in two days, the sores dried up in a week, and healed by the end of fifteen days.

R. P. Cockin[3] reports forty-five cases of yaws treated by intramuscular injections of salvarsan in Grenada, West Indies. On account of its cost it has been chiefly used in the worst cases. The salvarsan was emulsified in a sterile test-tube with 10 to 12 min. of pure glycerin, made up to 10 c.c. with 0·5 per cent sodium chloride, and injected in the gluteal region. A dose of 0·6 gram was given in adults, and a smaller one in children. The results were very satisfactory, and much saving was effected by the short stay of the patients in hospital.

Salvarsan-Copper gave useful results (*p.* 32).

REFERENCES.—[1]*Lancet*, 1914, i, 370; [2]*Jour. Trop. Med. and Hyg.* 1914, 193; [3]*Lancet*, 1913, ii, 1609.

The two following papers are unavoidably placed out of their alphabetical order.

COCCYGODYNIA. *Purves Stewart, M.D., F.R.C.P.*

Hamant and Pigache,[1] of Nancy, make a plea for the stricter definition of the term coccygodynia, and protest against confounding it with such conditions as pain due to anal fissure, to inflamed hæmorrhoids, or to pelvic troubles such as metritis, salpingitis, or uterine retroflexion. Coccygodynia is a term to be reserved for a well-defined syndrome consisting in pain limited to the coccyx. This affection is

PLATE LXI.

XANTHOMA TUBEROSUM

E. Graham Little, M.D.

the result of dislocation or fracture-dislocation of the coccyx resulting from trauma, either external as from a kick or fall, or internal from prolonged labour. After an injury of this sort the patient complains of inveterate coccygeal pain, induced by change in position or by any movement of the numerous muscles attached to the coccyx. Thus the sitting posture is painful, and the patient rests upon one or other ischial tuberosity to prevent pressure on the coccyx. Walking is almost always painful. The position of ease is attained only by lying on the side. Rectal examination reveals an exquisitely tender spot at the front of the coccyx, which is often felt to be displaced forwards, and in some cases may form a right angle with the sacrum. If the soft parts just distal to the tip of the coccyx be compressed between the examining finger and thumb, this often produces exquisite but bearable pain, probably from pressure upon the diseased coccygeal plexus. According to Yeomans,[2] this distal tenderness is pathognomonic of coccygodynia. Owing to the pain of defæcation, the bowel often becomes obstinately confined. The patient may become profoundly neurasthenic and unfit for any active occupation.

TREATMENT.—Medicines are usually of little avail. The most efficient curative procedure is to **Excise the Coccyx** — a comparatively simple operation, by which the pain is forthwith removed. Absence of the coccyx does not entail any functional disability, whether of the anal sphincter or other structures.

In the opinion of Yeomans, however, excision of the coccyx is rarely necessary ; he records a series of cures by means of local **Injections** of 70 to 80 per cent **Alcohol** on the same principle as in Schlösser's treatment of trigeminal neuralgia. The technique, as described by Yeomans, is simple, and can easily be carried out in the out-patient department, under strict antiseptic precautions. The patient, with rectum empty, is placed on a firm table in the left lateral position, with the thighs fully flexed on the abdomen. The region of the coccyx is painted with tincture of iodine. A sterile syringe with capacity of 2 c.c. is filled with 80 per cent alcohol, and attached to a 2-in. needle of fine gauge. The index finger is inserted into the anal canal, and the point of maximum tenderness is determined by counter-pressure with the thumb outside. Maintaining the finger in the rectum to guard against its puncture, and to act as a guide, the needle is now introduced in the middle line directly to the painful spot. When this is reached, the patient calls out, owing to pain, which is exquisite but bearable. From 10 to 20 min. of alcohol are now slowly injected, the needle is withdrawn, and its puncture is sealed with collodion, after neutralizing the iodine on the skin with alcohol. The pain from the injection lasts only a few minutes, and may be followed by a dull ache for a day or two. A single injection rarely effects a complete cure. As a rule from three to five suffice, at intervals of about a week. Each is made at the point which is most tender at the time. A consideration of the somewhat broad distribution of the coccygeal plexus explains the necessity of repeated injections. Seven cases thus

treated are recorded by Yeomans, all in female patients. All were attributed to falls on the coccyx, except in one instance, when it succeeded parturition. In every instance the pain was cured. No recurrence had taken place, after intervals varying from one month up to four years. Should relapse occur, the treatment can be repeated.

REFERENCES.—[1]*Rev. de Chir.* 1914, 70; [2]*Med. Rec.* 1914, ii, 322.

DELIRIUM TREMENS. *Purves Stewart, M.D., F.R.C.P.*

The mortality in delirium tremens is variously estimated at from 3 to 10 per cent or even higher. Scharnke[1] has collected 69 cases of delirium tremens in the Strassburg clinic during four years, with a total mortality of 8, giving an average of 11·6 per cent.

TREATMENT.—Most text-books insist upon the value of prolonged **Hot Baths** for their sedative action, their duration varying from several hours to a whole day. Apart from the difficulty of carrying them out, except in an institution with baths specially arranged for the purpose, Scharnke maintains that this treatment is by no means devoid of risk, especially in cases complicated by pneumonia. He points out the striking degree of fatigue and relaxation which a prolonged hot bath produces, even in a healthy individual with normal heart and blood-vessels, so that subsequent muscular exertion is impossible. The pulse in delirium tremens is nearly always fast, rarely below 100, and sometimes as high as 150 or even 180 per minute. Accordingly, on account of the tendency to cardiac failure in delirium tremens, he has discarded the hot-bath treatment entirely. Even for cleansing purposes no bath is given, but the patient is washed in bed, limb by limb. The greatest danger of delirium tremens, viz., heart failure, is best treated by the routine administration of some form of **Digitalis,** e.g. **Digalen** 10 min., three times a day. In fully developed delirium tremens alcohol is unnecessary as a stimulant, although it is sometimes useful to administer digalen or other drug in an alcoholic vehicle such as a little sherry, to induce the patient to swallow it. To combat the patient's excitement, isolation in a private ward is advantageous, together with powerful sedatives of some kind.

In former days a favourite routine treatment was by means of **Bromide** (20 gr.) and **Chloral** (30 gr.) every four hours. In recent years, however, massive doses of **Barbitone** (veronal) have been successfully employed. Von der Porten,[2] of Hamburg, records 264 cases treated with barbitone, compared with 396 cases treated with bromide and chloral; and finds the results in the barbitone series much more satisfactory. He commences boldly with 30 gr. of barbitone, which is singularly well tolerated. If the delirium persists, another 15 gr. is given after five hours and, if necessary, a third dose of the same amount after twelve hours. Even with massive doses like these, no deleterious effects on the heart have ever been noted by von der Porten. Moreover, under barbitone treatment the motor restlessness is successfully allayed, the patient sleeps quietly, and an isolation ward becomes unnecessary. The same treatment may

also be employed to cut short abortive cases of threatened delirium tremens.

Kramer,[3] of Cincinnati, notes that in delirium tremens the amount of cerebrospinal fluid is increased, as if from cerebral œdema, since lumbar puncture readily withdraws 50 to 60 c.c. under pressure. This fluid is exceedingly toxic and, if injected into dogs, produces a rapid fall in blood-pressure. The withdrawal of cerebrospinal fluid in cases of delirium tremens often produces a temporary improvement in the symptoms, which lasts a few hours. The efficacy is much enhanced if, immediately after withdrawal of the fluid, an equivalent amount of a sterile 1 per cent solution of **Sodium Bromide** is injected **Intrathecally.** Kramer has employed this treatment in twenty cases, and vouches for its safety and efficacy. The technique consists in withdrawing cerebrospinal fluid by lumbar puncture in as copious amount as possible, up to 50 or 60 c.c., and at once injecting an equivalent quantity of the sodium bromide solution. The potassium salt must not be used, since it is slightly irritating. The patient, as a rule, shows an immediate improvement, a lessening of the delirium being produced within a few minutes. The immediate improvement, however, disappears after a short time, to be followed in from twelve to fifteen hours by a permanent disappearance of the delirium. Occasionally, after a few days, there may be a relapse, which is successfully controlled by a repetition of the injection.

References.—[1]*Münch. med. Woch.* 1914, 717; [2]*Ibid.* 1179; [3]*Boston Med. and Surg. Jour.* 1913, ii, 646.

Part III.—Naval and Military Surgery.

MODERN NAVAL SURGERY.

BY

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THE fact that naval medical officers have always been officially styled 'surgeons' calls attention to the point that originally, at all events, the surgical treatment of the wounded in action was the primary object of their existence in the Fleet. In recent times there have been few opportunities for British naval surgeons to gain experience of warfare afloat. Such practice as they may have had in military surgery has been acquired when attached to naval expeditionary forces serving ashore; but during many generations of peace their duties have been expanding and developing, keeping pace with advances in all branches of the treatment of injuries and of disease, so that at the present moment, when our country is dependent upon the supremacy of our Fleet, the naval medical service is composed of men not only well qualified in surgery, but as highly trained in medicine, naval hygiene, and sanitary science generally, many of whom have held special appointments in the naval hospitals, as physicians, operative surgeons, anæsthetists, bacteriologists, syphilologists, radiographers, etc.

Let us say at once that although 'Modern Naval Surgery' may serve for the title of this article, modern naval surgery differs only from general surgery in that it specializes in the diseases and injuries of the male. It is true that there are some appointments held by naval medical officers which require attendance upon women and children; but they are few, and the actual surgical practice is small.

In these days of fast-steaming fleets, when long voyages are rare, the sick are seldom kept long afloat, but are sent as soon as possible to the naval hospitals; and the same holds good for war-time, for although the warships may be away from port for many weeks, the sick and injured are transferred to hospital ships and carriers to be conveyed to the shore establishments.

To those who imagine the practice of naval surgeons confined to their duties on board ship, the existence of the great naval hospitals at home and abroad, with the many subsidiary sick-quarters, will be a revelation. These hospitals, perfectly equipped in all modern

requirements, are staffed in peace-time by the naval medical service under the administration of a senior medical officer. The staff in the larger establishments is composed of medical officers and sick-berth ratings (male attendants). All are appointed for a limited period, and many specialize for the time in particular subjects. In addition, there is a large staff of naval nursing sisters, a chaplain, civilian dental-surgeons, and officers of the accountant branch of the Navy. The huge home establishments at Haslar, Plymouth, and Chatham cover many acres of ground (Haslar Hospital encloses 46 acres, and accommodates 1037 patients in peace, and very many more in war-time). They are complete institutions, containing medical and surgical divisions, zymotic and lunacy buildings, laundry, water-works, residences for staff, a chapel, recreation and concert rooms, etc. There are well-furnished bacteriological laboratories, operating-rooms, *x*-ray and electrotherapeutic and massage and dental rooms. These hospitals form the home of modern naval surgery. A very large number of operations are performed therein daily.

All medical officers upon entry into the naval service pass a probationary period in hospital, and later a large proportion of them hold hospital appointments at some period of their service. By this arrangement, and by post-graduate courses at Greenwich, the medical officers keep in touch with modern methods, so that when embarked they are prepared to undertake any emergency operations, either in the excellently equipped sick-berths of our battleships and cruisers, or amid such strange and awful surroundings as attended their work ashore at Messina. From amongst the senior officers certain are selected to specialize in operative surgery and for administrative control of the surgical sections of the hospitals.

Having briefly referred to the hospital accommodation and organization, let us consider the nature of the material that supplies the operative practice in peace-time. In addition to the sick and injured discharged from ships for treatment in hospital, the large hospitals receive cases from all naval establishments in the vicinity of the port, and invalids from abroad; also emergency cases occurring amongst naval pensioners and others, and, by special authority of the Admiralty, officers on the retired list. These naval establishments include training establishments for cadets and boys, naval and marine barracks, and the great naval dockyards and victualling yards, where thousands of civilian workmen are employed in shipbuilding, machine-shops, etc. So it will be seen that the hospital practice is not limited to the treatment of diseases and injuries arising in selected men in the prime of life, but includes a wide range, i.e., from fourteen years to old age, or, putting it surgically, from the age of 'mastoids' to the age of 'prostates' and late malignant growths.

Some idea of the surgical work of naval medical officers can be gained from the current "Statistical Report of the Health of the Navy," which records a total of 4311 operations (exclusive of dental operations and salvarsan intravenous injections) performed in the

hospitals at home and abroad, and in the late hospital ship *Maine*, during the year 1912. Many of these operations were for the relief of disabilities such as hernia, varicose veins, varicocele, deranged cartilages, etc., for which men were formerly discharged as unfit for service. Taking hernia as an index of these diseases, we find 570 operations for radical cure, while appendicitis with 236 operations may be taken as roughly indicating the relative proportion of acute operations.

A glance at the records of the past few years shows an increasing number of operations *de luxe*—gastro-enterostomy, ileosigmoidostomy, and laparotomies for duodenal ulcers and for obstructions. Nephrolithotomy, nephrectomy, and prostatectomy indicate confidence and efficiency in urinary surgery, while the numerous operations on the nose and ears and the platings of fractures show not only the wide range of the work but the enterprise and versatility of the modern naval surgeon, who, when taking up operative surgery, is not permitted to specialize in any particular branch of the art. Thus it is 'all in the day's work' whether he tackles a delicate iridectomy or undertakes a piece of heavy bone-carpentry.

That modern naval surgery in war-time will exact such versatility and will embrace the whole art is evident when we consider the multiple injuries caused by high explosives—the immediate lesions and their sequelæ. This is exemplified by the first two cases of wounded to arrive at Haslar during the present war. They are survivors from a gunboat sunk by a mechanical mine. Their injuries were caused by the explosion.

Case 1.—*Injuries.* Compound fracture of left ankle, with almost complete avulsion of the astragalus; comminuted fracture of both bones of left leg in middle third, with great displacement, radiogram showing a large fragment of tibia driven upwards a considerable distance from seat of fracture.

Operative Treatment. Immediate, in hospital ship: Excision of astragalus; later, in hospital, plating bones of leg.

Case 2.—*Injuries.* Dislocation of left knee, rupture of both crucial ligaments, and backward displacement of tibia, with fracture of portion of inner articular surface. Injury to popliteal nerves. Compound fracture of right femur. Lacerated wound of face. Punctured wound of right eye, with hæmorrhage into vitreous.

Immediate Operation in hospital ship: Amputation through right thigh; suturing of wounds. *Later treatment*: Reduction of dislocation of left knee, and possibly, later, arthrotomy and ligature of crucial ligaments. In addition, radiograms are required to determine the condition of the knee injury and for possible foreign body in the eye. Ophthalmoscopic examinations are also necessary.

These are our first two cases! Who will venture to define a limit to modern naval surgery?

The outbreak of war finds the medical branch of the Navy in the same high state of efficiency that characterizes the other branches of

the service, with a personnel of highly-trained medical officers, nursing sisters, and sick-berth ratings, with an organization that permits an immediate and vast expansion by calling up reserves—auxiliary and temporary officers, nurses, and attendants; hospitals and hospital ships in full equipment, the former capable of considerable expansion in accommodation and supplemented by subsidiary convalescent quarters.

On the word 'Mobilize for war,' the machinery was put in motion. Officers selected for operative ability were placed in charge of hospital ships and carriers. The medical staff on the warships was brought up to full strength, the medical and nursing staff of the hospitals increased by the addition of civilian surgeons engaged for the period of the duration of the war, consultant physicians and surgeons, reserve nursing sisters, and auxiliary sick-berth staff.

A reference to the admirably compiled "History of the Naval War between Japan and Russia, 1904–5," shows that the injuries on active service afloat may be divided into those directly inflicted by the enemy, and those received in the many accidents incidental to strenuous work. The *injuries proper to warfare* are caused chiefly by shells, which may injure directly by contact, by projection of shell-fragments, by impulse of débris of exploded charge (explosion wounds), by burning from flame, by concussion, and by gas asphyxiation; or indirectly by fragments of iron, wood, glass, or any other material forming part of the construction or fitting of the ship, furniture, or clothing. There are also scalds from the escape of steam. Mechanical mines injure directly by force of explosion, by direct projection, and by exploded gas; indirectly by flying pieces of iron, wood, coal, etc., and by displacement of heavy objects. When seamen and marines are employed ashore, injuries by rifle bullets, shrapnel bullets, and parts of the shrapnel casing, stones, and other material projected by shell impact or explosion, or by explosion of land mines, will be met with. It is interesting to note that in the Japanese War the great majority of injuries by shell explosions were wounds and burns of the head and limbs. The proportion of chest and abdominal lesions is small. Men within the flame area of a bursting shell are severely burned in addition to receiving injuries from concussion, from impact of missiles, and from the inhalation of poisonous gases. When outside the flame area but within the zone of concussion, they may receive explosion wounds, i.e., a 'peppered' condition of the skin from the impaction of more or less irritating particles of the débris of imperfectly combusted explosive material.

The wounds caused directly and indirectly by shell explosions are, of course, of infinite variety, ranging from extensive mutilations to trivial contusions and abrasions. The actual wounds are generally lacerated, and are clinically remarkable for the comparatively slight degree of hæmorrhage attending them.

The concussion of bursting shells and mechanical mines frequently causes rupture of the tympanic membrane, and occasionally a complete

or partial amaurosis, the nature of which is not yet fully understood. It is to be distinguished from the so-called 'supra-orbital' amaurosis which follows injury to the optic nerve from a severe blow to the orbit.

Of all injuries, burns and scalds are likely to be the most numerous. Scalds are especially liable to occur in small ships such as destroyers or torpedo-boats from damage to steam-pipes, etc. It is noteworthy that all these injuries may be complicated by the effects of immersion and by exposure to cold. Injuries received afloat are observed to be less prone to sepsis than those inflicted in the field, and when infection occurs, the septic processes show little tendency to spread beyond the seat of injury. Tetanus is uncommon, for obvious reasons.

Injuries not directly inflicted by the enemy include those caused by accidents such as bursting of guns, machinery accidents, and accidents during 'coaling ship.'

With the exception of quite small vessels, all ships are supplied with every necessary surgical instrument and appliance, including anæsthetic and *x*-ray apparatus. In addition to the ordinary supplies of dressing material, emergency-chests containing extra dressings are carried for exceptional occasions only.

The spacious sick-berths where the patients are ordinarily quartered are too exposed in situation to be used during action. A site within the protection afforded by the armoured sides and decks and by the coal in the bunkers is previously selected, and forms, during the fighting, the main hospital. At least two temporary first-dressing stations are arranged in other and accessible parts of the ship. They are furnished with surgical supplies, and are designed to be independent of one another. Special arrangements are made for lighting and for the supply of hot and cold water. The medical staff is supplemented by certain non-combatants, officers and men who have been trained in first-aid, and by stretcher parties who collect the wounded during lulls in the action and lower them down the hatches to the dressing stations by one or more of the approved methods, i.e., inclined planes, jacket-fitting stretchers, cradle-hammocks, etc. First-aid instruction has been given to the whole ship's company. In the gun-turrets and other isolated parts of the ship, tourniquets and first dressings are provided for emergency application by members of the guns' crews. The whole organization is rehearsed when the ship's company is exercised at 'general quarters,' and the working of its arrangements is frequently reported upon by the inspecting executive and medical officers.

The organization varies in detail with the class of vessel. The main points of the arrangements are the same. The collecting of the wounded is not attempted during the heat of the action, but during a pause, or when occasional shots are being exchanged at long range. The 'collecting parties,' assisted in some cases by combatants from the unengaged side of the deck, remove the wounded to the receiving

stations, where urgent cases are given prompt first aid, and slight and serious cases are sorted and the latter distributed by 'distributing stretcher parties' to a suitable place where the operating-tables have been set up. Here further treatment is given. They are then removed by the 'disposal stretcher parties' to some well-protected part of the ship adjacent to the dressing stations. The stretcher parties, having deposited their burdens, return to their original stations by a different route, thus avoiding congestion in the narrow passages between decks. Arrangements are made for the supply of hot soups and restoratives, and for the rapid injection of hypodermic solutions of morphine, etc.

To facilitate the administration of these injections, and to prevent the contamination of the solutions by the dust and débris of action, and also to avoid loss by upsetting of stock bottles, etc., the medical officers are supplied with a specially designed needle-fixed hypodermic syringe fitting with a two-way spring into a metal sheath or scabbard, which is secured by a safety-pin attachment to the lapel of the coat. This syringe is quickly released from its scabbard and as quickly returned. The solution is contained in shallow bottles closed by double caps of rubber. The strength of the solution is so arranged that one syringeful forms one dose. These bottles can be carried in any position without leakage, in the pocket or attached to a coat button. The needle-fixed syringe is drawn from its sheath, the needle thrust through the rubber caps into the solution, the injection given, and the syringe returned, the whole operation taking but a few seconds. There is no possibility of upsetting the bottles or of blocking the needles by particles of foreign matter, as may easily occur if the solution is exposed. By this means it is a simple matter to give an injection in the dark, a point of some importance. These syringes and bottles form part of the emergency outfit in all our larger warships. They would prove very useful in all military and ambulance work. The shape of the bottles may be varied to distinguish their contents by sense of touch; in this way pituitrin, camphorated ether, ergotine, etc., can be conveniently carried. Slight obliquity of the needle, when puncturing the double caps, ensures a valvular puncture which effectually prevents leakage. Armed with this syringe and solutions, a haversack containing some rubber tourniquets and large-size field-dressings, and carrying an ordinary bellows spray-producer containing a 2 per cent solution of iodine in alcohol, attached to the coat or belt by an improvised hook of wire, the surgeon is well equipped for promptly administering first aid. A pair of shears for cutting away clothing is a most useful addition.

After action the wounded are transferred to hospital ships and carriers to be conveyed to their ports, and thence by hospital boats or trains, or by ambulance, to their final destination in hospitals ashore. Cot cases are transferred from vessel to vessel in special cradles suspended from derricks.

OUTLINES OF THE PRINCIPLES OF TREATMENT.

Preparatory to action, particular attention is given to (1) The thorough cleansing and ventilation of the parts of the ship selected for dressing and receiving stations; (2) A sufficient water supply; (3) Selection of a mortuary; (4) General instructions to the crew upon the importance of going into action with clean clothing, the necessity of avoiding the touching of wounds with the hands, or applying handkerchiefs or other septic dressings, the plugging of the ears in the proper manner with cotton-wool, i.e., neither too tightly nor too loosely, and the use of other means for lessening gun-concussion; (5) The mode of application of first-aid dressings and the handling of wounded.

Early aid is generally limited to the arrest of hæmorrhage (the indiscriminate use of tourniquets is discouraged as leading to increase of pain and shock); early local application of iodine by means of the spray producer; the application of large-sized field dressings, and of temporary splints; and the administration of restoratives and anodyne hypodermic injections.

In *later aid*, attention is directed to the treatment of shock by application of warmth, subcutaneous injections of pituitrin, camphorated ether, or morphine, and saline and other rectal injections; and by nerve-blocking in severe crushing injuries to limbs.

Shell Wounds.—Hæmorrhage is not as a rule profuse, and can frequently be arrested by moderate pressure when the torn tissues are approximated. Judging from similar contused, ragged wounds met with in machinery accidents, these wounds, when there is no actual loss of tissue, will often heal by first intention if treated early and very thoroughly cleansed. An anæsthetic is generally needed, but often the parts are so benumbed by the severity of the injury that the toilette of the wound is scarcely felt. This toilette must be no half-hearted affair. It includes a thorough cleansing of the surrounding skin with spirit-soap and brush, and with a solution of biniodide in spirit, drying, and then applying iodine; free application of iodine and saline solutions alternately to the depth of the wound; paring the edges of the wound and the removal of badly damaged tissue; closing the wound completely, undercutting and making tension-relieving incisions if necessary in order to get good adjustment. Drains are avoided as far as possible: it is astonishing how rarely they are required when all foreign matter has been removed and iodine has been liberally applied to all parts of the wound. This treatment applies to compound fractures and compound injuries to joints. Experience shows that, taken early, cleansed and closed in the above manner, suppuration rarely originates in the depths of the wound. Sepsis when it occurs in these cases nearly always commences in the skin wound, spreading from some necrotic area. The daily spraying of the surface can generally be relied upon to prevent infection from this source.

We have had lately a large number of Belgian soldiers under treatment in this hospital (Haslar) for shell-wounds received at Antwerp. Many of these wounds were suppurating when first seen. Most satisfactory results were obtained by avoiding all germicidal antiseptic applications, and using normal saline and hydrogen peroxide solutions only. It is unnecessary to remove soiled splints if they are daily wiped over with tincture of iodine. Padded wooden splints covered with batiste have been kept sweet by this means for weeks without disturbing the limbs. The induction of passive hyperæmia by Bier's bandage or cups is often invaluable. Treatment by vaccines and antitoxic serums is too frequently disappointing.

Rapidly Spreading Gangrene from infection by anaerobic organisms is happily rare in naval surgery. The only case in my experience followed a compound fracture received on the football field. Emphysematous gangrene (*B. welchii*) occurred within twenty-four hours of the receipt of injury. Prompt amputation, and treatment by exposing the open flaps to a continuous stream of oxygen gas by means of a tube under light dressings, saved the patient's life, although the flaps were crackling with emphysema at the seat of amputation.

Tetanus is so rarely met with in injuries received afloat that prophylactic injections need not be considered. A case was successfully treated in this hospital by subdural (intracranial) injection of antitoxin (I believe this was the first case so treated in England).

Bullet Wounds belong properly to the domain of military surgery, but here, as in other naval hospitals, we have been treating several hundred cases of rifle and shrapnel bullet wounds. They must be considered outside the scope of this article. It is, however, interesting to note that in many completely penetrating wounds, sepsis, when it occurs, is often confined to the first and last inch or so of the bullet track. A complete sinus rarely exists between the wounds of entry and exit, because of the varying densities and shifting planes of the tissues. The bullet in these cases does not itself appear to carry infection. Sepsis takes origin from the skin, and is often limited to the immediate subcutaneous tissues.

Burns and Scalds may be expected to form a large proportion of the injuries received in naval actions. The records of the Russo-Japanese War show that few cases of very extensive burns survive. Great difficulty is experienced in removing the clothing when there are many cases and the staff small, and it would seem that unless a general anæsthetic can be given it would be best not to make any early attempt. It is possible, in the case of severe burns of limbs, that nerve-blocking or spinal analgesia may afford a means of lessening shock and permit of painless dressings. Picric-acid applications are suitable only in burns of minor degree. The earliest treatment must be directed to the relief of pain and shock by the administration of hypodermics of morphine and by saline injections, subcutaneous or rectal, and by limiting dressings to exposed parts. When it is possible to afford time for a thorough toilette, heroic cleansing of the lesions with

brush and ether soap, washing with saline, and the application of iodine offer the best chance of limiting sepsis. Simple saline dressings applied over rubber-tissue made permeable by 'Venetian-blind' slits give good results. They are easily and quickly removed without distressing the patient. Continuous baths may be necessary in severe cases, but this form of treatment is obviously impossible when a large number of cases have to be dealt with. Acetate of alumina and calamine lotion are favourite applications in burns of lesser degree.

A wide field for modern naval surgery may be expected when we come to deal with the remoter effects of wounds in action—plastic operations for cicatricial deformities, nerve restorations, the cure of aneurysms, and ununited fractures. In operating upon ununited fractures of long standing, most gratifying results have been obtained by 'long-axial' drilling of the indurated bone-ends. The method is described in *The British Journal of Surgery*, January, 1915.

MILITARY SURGERY.

BY

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SINCE the Spanish-American war, in 1898, several important wars have occurred, each of which has been fought with new engines, and the character of the wounds inflicted, their prognosis, and treatment, as compared with wounds inflicted by the armaments of twenty-five years ago, are of special interest to military surgeons.

I. HAND WEAPONS.

The character of **Rifle** wounds has been largely modified by changes in the military rifle, which are marked by reduction in calibre, and the use of cupro-nickel, or steel-jacketed bullets.

The velocity has been trebled, and notwithstanding the material reduction in the weight of the rifle bullet from 480 to 150 gr., the striking energy of the new and lighter bullet is 2,400 foot-pounds, as compared with 1,954 foot-pounds for the heavier bullet. Its hardness and its pointed shape have added materially to its penetrating power (*Plate LXII, Fig.* 1).

The smaller bullet will in a general way cause less traumatism when it encounters soft parts or parts offering but little resistance. In studying the destructive effects illustrated, it should be remembered that the pointed bullet which inflicted the injuries is very unstable. Its centre of gravity is well placed toward its base, and the least resistance causes the bullet to turn side on (*Plate LXII, Fig.* 2), a circumstance which no doubt adds to the destructive effects. When it traverses parts like compact bone, offering a maximum amount of resistance, the degree of destruction is very great (*Plate LXIII, Fig.* 3). This is the bullet that has recently been adopted by Germany, the United States, England, and Turkey. It was first used in active campaign by the latter in the Turko-Balkan War.

Revolvers in the military service range in calibre from 0·38 to 0·45. They fire elongated lead bullets which are prone to disintegrate against resistant structures. The wounds which they cause at short range are attended with extensive traumatism when resistant structures are hit. The **Pistol** is displacing the use of revolvers in civil communities and the military services as well. It is operated by a movable barrel and slide. The recoil ejects the empty shell, cocks the piece, and throws a new cartridge into the barrel. After the first shot has been fired it is only necessary to pull on the trigger for each succeeding shot

to empty the remaining shots in the magazine. The latter holds seven or eight cartridges, depending upon the make of weapon. In the U.S. Army the bullet of the Colt's automatic pistol is composed of a lead nucleus enclosed in a jacket of cupro-nickel weighing altogether 230 gr. The explosive charge is 5 gr. of smokeless powder, and the initial velocity is 900 feet per second as compared with 763 feet per second for the bullet of the 0·38 calibre Colt's revolver recently discarded. The projectile of the Colt's automatic pistol has greater penetration, it is not so easily deformed as the lead bullet in the revolver mentioned, and the destructive effects which it exhibits are very much greater. *Figs.* 4 and 5, *Plates LXIII*, *LXIV*, exhibit the differences in destructive effects between the power of revolver and automatic pistol bullets. The difference is all the more strikingly shown since the calibre of the Luger pistol is so much less.

Gunshot Wounds of the Head.—The relative number of gunshot wounds of the head has increased materially in modern wars with the rapidity and accuracy of fire. In addition, soldiers are now drilled to fight under cover, and the head is exposed longer and more often than the remainder of the body. Before the change in armament, the percentage of head wounds was about 8. In the Spanish-American war, out of 4756 gunshot injuries of all parts, the head, face, and neck were hit in 15·26 per cent of the total. Fischer gives 20 per cent of head wounds out of all injuries in the Russo-Japanese war. Gunshot wounds of the head proper may be divided into : (1) Those of the scalp ; (2) Shot wounds of the skull without lesion of its contents, which include contusion of the outer table, guttering, and fracture of the outer or inner table ; and (3) Shot fracture of the skull with brain injury.

Wounds of the scalp *per se*, by reduced calibre bullets, are generally trivial, and under modern methods require little more than the application of a clean dressing. The hair should be shaved or cut as short as possible with scissors. Wounds presenting short subcutaneous tracts should be laid bare by connecting the wounds of entrance and exit. In the emergency conditions of active campaign when water is scarce, the wound and adjoining skin should be swabbed with a 50 per cent solution of tincture of iodine, after which the parts should be dressed with a first-aid dressing. In field and base hospitals where all necessary facilities are at hand, dressing should be practised after the usual method of scrubbing with soap and brush and liberal irrigation with solution of bichloride of mercury 1–4000. Unrecognized cranial injuries are sometimes found in what appear to be simple scalp wounds, and for that reason all wounds of the scalp should be kept under the watchful care of the surgeon for at least forty-eight hours.

Skull Injuries without Lesion of Cranial Contents.—In this class there is contusion, fracture of the outer table alone, or fracture of the inner table alone, or there may be fracture of both inner and outer tables without brain lesion. Contusion of the skull is rarely seen from armoured rifle bullets. In such cases the periosteum is lacerated,

exposing the bone more or less. Fracture of the outer table alone is equally rare. It is the general rule in all injuries involving fracture of the outer table to find fissuring into the inner table. However, Stevenson and Makins each report a case from the Boer War in which there was fracture of the outer table without lesion of the inner table, from hits by the reduced calibre bullet. Fracture of the inner table alone from direct violence to the outer table has frequently been noted by military surgeons from gunshot by the old armament. Such a lesion can only arise on impact of an obtuse body moving at low velocity, during which the outer table is made to yield temporarily against the inner table, with resulting fracture of the latter. The greater penetrating power of the armoured bullet tends to fracture the outer and inner tables at the same time, so that the strange accident of an inner table fracture from direct external violence is now seldom seen from gunshot.

Gunshot Fracture of the Skull with Concurrent Brain Injury.—This class of cases is usually divided into gutter, penetrating, and perforating fractures. The fatality from gunshot of the head involving cranial contents was 59·2 per cent in the Civil War ; 51·3 per cent in the Franco-German war ; 51·6 per cent in the Spanish-American War ; 29·4 per cent in the Anglo-Boer War (Stevenson) ; and 29·5 per cent in the Russo-Japanese War (Follenfant). The lower mortality-rate in the last two wars, as compared with the higher mortality in the Spanish-American war, is probably the result of recording the results from a restricted class of cases. Our statistics were gathered from the battle line to the base hospitals, and they are assumed to represent more correctly the present mortality from injury with the new armament, which is generally conceded to be almost as high as formerly. Still, the English, Russian, and Japanese surgeons have brought out very forcibly the fact that the mortality from head wounds can be materially reduced by clean, prompt, and radical surgical treatment.

Gutter fractures are more common with the use of steel-clad bullets. In the minor degrees of guttering there is grooving of the outer table. In superficial guttering there is only a slit of the scalp, but more frequently oval wounds of entrance and exit are seen which mark the limit of the bullet's track. The vibratory force of the new bullet comminutes the inner more than the outer table, a fact which should prompt the surgeon to a minute examination of all gutter fractures in modern wars.

In penetrating fractures we find a wound of entrance without an exit wound, and the missile is nearly always lodged in the skull. Missiles lodged in the skull are not so frequent with the use of high-power hand weapons. Patients have been known to live in comparative comfort for many years with missiles lodged in the brain. For example, Private John Gretzer (*Plate LXV, Figs.* 6, 7), in the Philippine insurrection in 1899, was shot by a Mauser bullet. Up to the present time (October, 1914) he is enjoying good health, and filling the post of inspector in the Government postal service.

In point of frequency, perforating fractures, in which the ball passes in and out of the skull, stand next to gutter fractures. They are extremely fatal; the majority of the cases never live to reach either field or base hospitals. Perforating head fractures at close range by the high-power military rifle exhibit the typical lesions known as explosive effects in tissues. Near the muzzle the pulpification of the tissues is extreme. At 350 yards, fissuring of the skull and laceration of brain substance is still extensive. *Figs.* 8 and 9, *Plate LXVI*, are photographs showing two views of Private Patrick D., who committed suicide by shooting himself in the mouth with the U.S. army service rifle carrying the steel-jacketed pointed bullet. *Plate LXVII* is a photograph of the skull of a prisoner who was shot at 60 yards while attempting to escape, by the Krag-Jorgensen rifle which carried the ogival-headed steel-jacketed bullet, weighing 220 gr. These explosive effects cease beyond 500 yards, but exaggerated lesions are again noted in the extreme ranges—at 2000 yards and beyond, due possibly to the fact that the bullet travels at a tangent to its line of flight as it becomes more and more unsteady in the remote ranges. The complications are concussion, compression, and hæmorrhage, meningitis, encephalitis, hernia cerebri, and brain abscess.

Treatment of Gunshot Fracture of the Cranium.—All gunshot wounds of the head are infected, and death, except when it occurs in the first few hours, is due to complications and sequelæ arising from sepsis. Transverse or oblique shots disposed toward the deeper parts of the brain, except those in the frontal lobes, are uniformly fatal. The surgical treatment, in gunshots of the skull that give any hope of recovery, consists in prompt and radical exploration, and the time for operation is immediately after the receipt of the injury. The scalp should be shaved and cleansed in the regular way, and when this is not possible through lack of water, the wound and surrounding surfaces should be painted with *weak tincture of iodine* (*tinct. iodi*, B.P. 1898) or Lugol's solution. A convex flap is next raised, having the entrance wound as its centre, with its convexity directed to favour drainage to the best advantage. When necessary, the opening in the skull is enlarged with a rongeur. All loose fragments are removed, and the entrance wound in the brain matter is carefully explored to a depth of two inches or more to remove all fragments and extraneous matter. Disintegrated brain-pulp and blood-clots are next washed away, and the scalp wound is sewed, leaving no drainage. The latter can be easily secured later if necessary. Early union minimizes the chances of infection and its complications. The exit wound should be cleansed and treated likewise. Gutter fractures should be cleansed of all fragments from both tables, and the edges of the channel smoothed by rongeur forceps. Depressed fractures without perforation should be treated in the usual way. All gunshots of the skull should be thoroughly explored, after removing a half-inch crown, whether fracture is evident or no. The value of careful search for a hidden lesion is shown by the number of cases in war, of apparently trivial

PLATE LXII.

These, and the following figures, are kindly supplied by Colonel La Garde, with the assent of his publishers from "Gunshot Injuries."

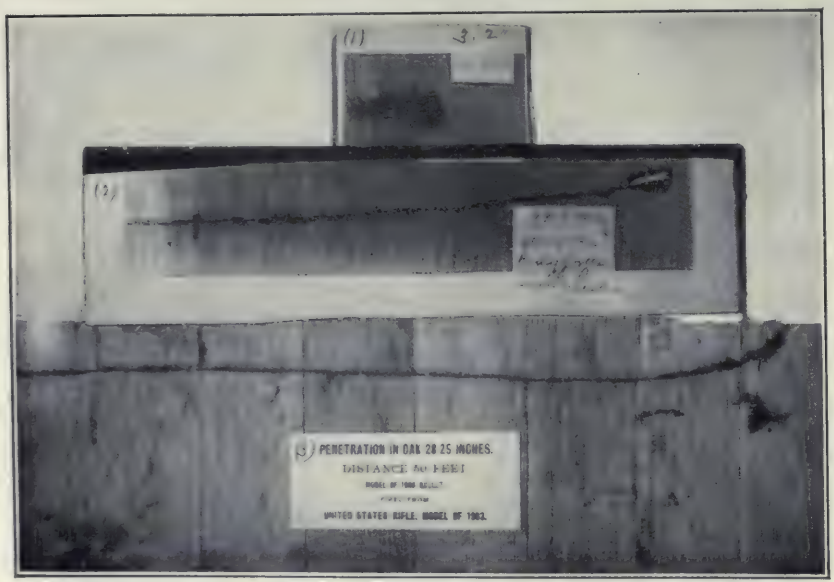


Fig. 1.—Relative penetration of U.S. army bullet in well-seasoned oak at 50 feet. No. 1: 3·2 in. No. 2: 19·5 in. No. 3· 28·25 in.

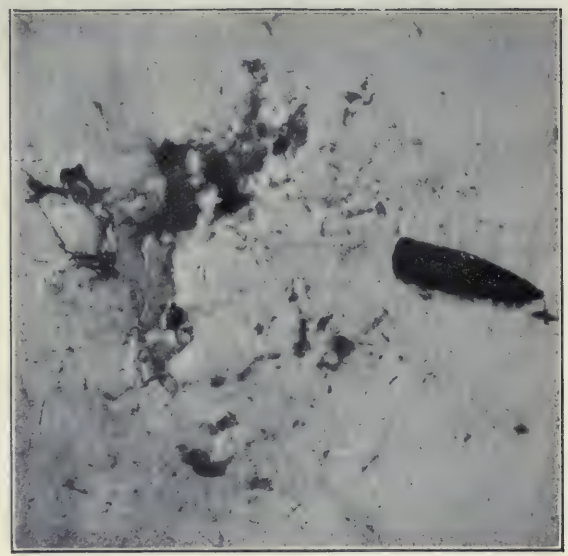


Fig. 2.—Showing the unstable character of the bullet—how it has turned, and gone through blotting paper immediately behind the target, side on.

Fig. 3.—Explosive effect of pointed bullet at 100 yards. Exit wound, 6 in. by 3 in., large enough to admit fist. Entrance wound—round, and size only of bullet.

Fig. 4.—Skiagram of bullet wound in head of cadaver from a Colt's service revolver at close range. Ball flattened; lost its penetration; and lodged Compare with destructive effects shown in *Fig.* 605.

PLATE LXIV.

Fig. 5.—Gunshot fracture of cranium by the Luger automatic pistol. Bullet entered left orbit, and emerged above and behind right auditory meatus, effecting terrible destruction.

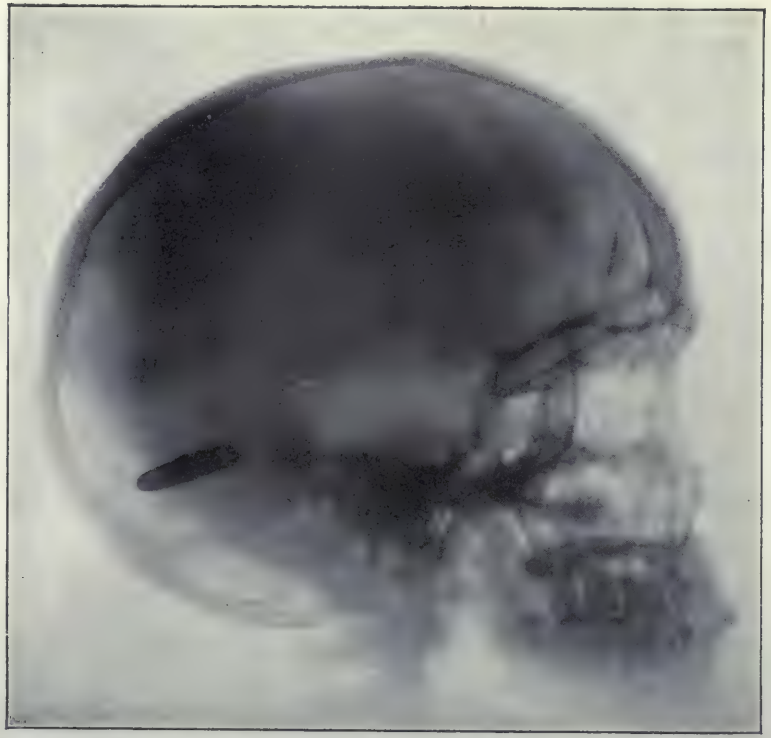


Fig. 6.—J. G. Skiagram showing present location of Mauser bullet in brain, thirteen years after injury.

Fig. 7.—J. G. Taken at the same time as *Fig.* 6. Scar from wound entrance shows above inner canthus of left eye.

SIDE VIEW.

POSTERIOR VIEW.

Figs. 8, 9.—Case of P. D., who shot himself in the mouth with U.S. army service rifle.

PLATE LXVII.

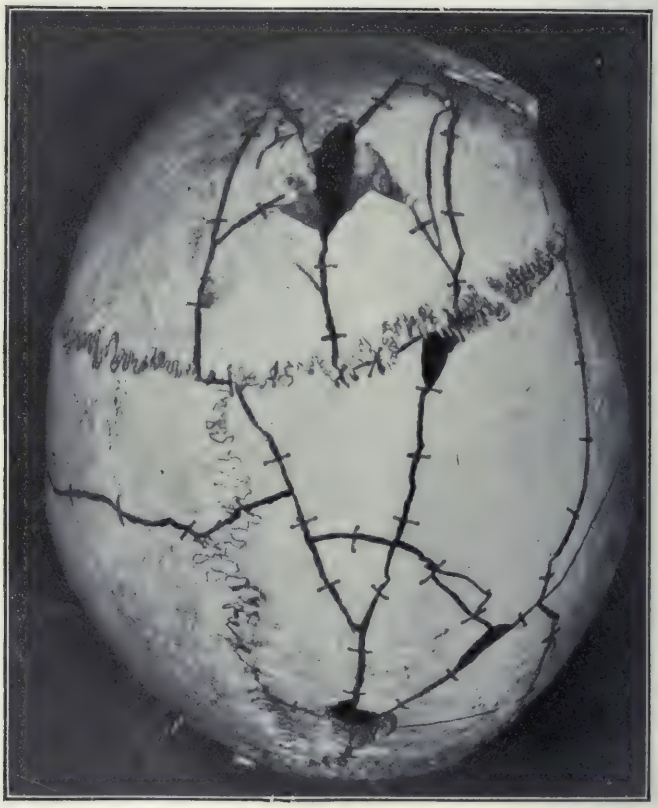


Fig. 10.—Skull of prisoner shot at 60 yards with a steel-jacketed bullet weighing 220 grains.

PLATE LXVIII.

Fig. 11.—Bullet wound of abdomen, self-inflicted with U.S. army service rifle. Shows the denuded and lacerated intestine.

Figs. 12, 13.—Same case as *Fig.* 11, showing omentum covering lesion in wound.

Fig. 14.—Skiagram showing Turkish rifle bullet lodged in left knee joint.

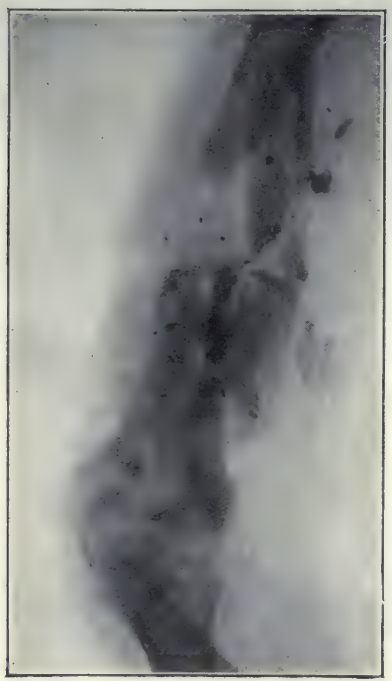
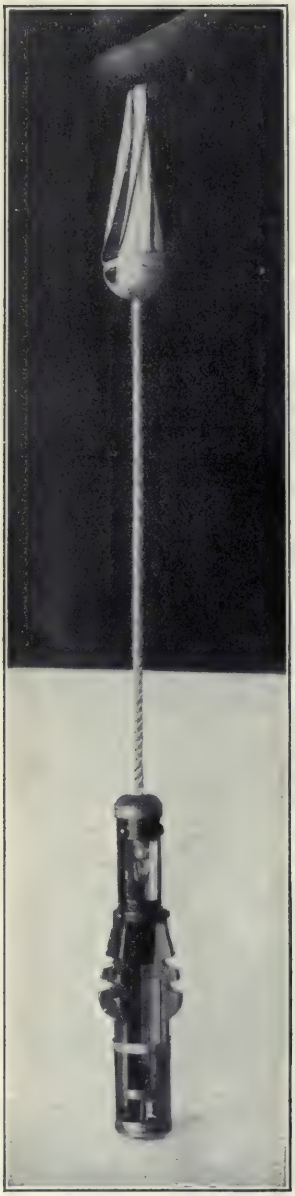


Fig. 16.—Fractured humerus. Showing the effect of Turkish bullet at 400 metres.

Fig. 15.—Showing the effect of U.S. army pointed bullet on femur at close range.



Figs. 17, 18.—Shows the hand grenade used in the U.S. army, and the fragments after bursting. The modern grenade came into special and revived prominence during the Russo-Japanese war.

contusions, which terminate fatally later from brain or meningeal injury. This occurrence in gunshot is common, because the energy distributed on impact is usually greater from bullets than other objects inflicting traumata, and the dispersion of this force is apt to fissure the brittle skull, a condition which is not readily apparent to the sense of touch or sight.

The reduction in weight of rifle and pistol bullets permits lodged missiles to lie imbedded in brain tissue, in some cases with but few of the annoying or dangerous symptoms that marked such cases in former times. No attempt at removal should be made unless the missile can be readily reached. The risks of operation are great, and the inconvenience caused by the ball is usually trivial compared with the danger which attends operation.

Gunshot Wounds of the Spine.—These are the most fatal of all war wounds. In the Spanish-American war our mortality was 75 per cent, and Stevenson records a mortality of 60 per cent in forty-eight cases from the Anglo-Boer war. He further states that cases exhibiting fracture of the neural arch and actual lesion of the cord by bone or missile in all regions of the spine give a death-rate of over 78 per cent. These figures go to show that gunshot injuries of the spine are even more fatal to-day than formerly. In addition, there is plenty of evidence to show that gunshot wounds of the spine by high-velocity jacketed bullets are more common than formerly. The layers of tissue (abdominal wall and contents, thoracic walls, and viscera) no longer protect against the superior penetration of the new bullet. Splintering of the neural arches is more frequent. Furthermore, secondary missiles composed of spiculæ of bone and metallic fragments from the projectile itself are liberated by the force of impact in proportion to the velocity and energy of the bullet. Splinters of bone and metallic particles traverse the spinal canal or the immediate vicinity of its bony walls with readiness; hence the frequency of direct lesion of the cord with the new arm as compared with the effects of the old-time bullets with low momentum.

In addition to severe lesions from direct energy, Makins has pointed out cases of **Severe Concussion** as a result of the new bullet travelling at great velocity when it collides with the spine. The vibratory force which is transmitted to the cord causes a complete disorganization of its substance. The symptoms are those of a complete transverse lesion. The force of impact has also been shown to cause contusion by *contre coup*. In such cases the post-mortem has shown adhesion between the cord and dura opposite the point of impact on the bony canal. The grave lesions from concussion and contusion generally end in death, like those from direct injury; whilst the slight contusions, though attended with paralysis that lasts for weeks and months, get well. The lesion in all these cases is associated with small surface hæmorrhages (extra- and intradural) as well as intramedullary hæmorrhages (hematomyelia).

Apart from the usual measures necessary to avoid infection, the

Treatment of gunshot of the spine is expectant. Transport should be delayed whenever possible. The general measures of treatment are much the same as those employed in civil life as a result of injury due to other causes. Displacement of bony parts from gunshot by the reduced calibre bullet is rare. Shots through the centra usually end in complete perforation. The mechanical appliances used to maintain extension and counter-extension, resorted to in civil hospitals for fracture dislocations, are seldom necessary in the gunshot injuries under discussion. Laminectomy, which finds so much favour in civil practice, can have but little application in military surgery. Nine-tenths of the cases of spinal injury are due to " the conditions of concussion, contusion, or hematomyelia " (Makins), for which operative treatment can be of no avail. A formal laminectomy can only be indicated for the relief of irritation and compression. Compression from blood-clot may be suspected by the clinical history, whilst compression from a spicule of bone or a lodged ball will be revealed by *x*-ray evidence.

Gunshot Wounds of the Chest.—At Santiago we found wounds of the chest by the reduced calibre military rifle to be attended with less fatality than any of the body wounds, and this is the universal experience of military surgeons in recent wars. The humane character of steel-jacketed bullets is nowhere better shown than in chest wounds. Our mortality in the Spanish-American War and Philippine insurrection in 283 cases of penetrating wounds of the chest was 27·5 per cent, as compared with 62·5 per cent in the Civil War. In the Boer War the British lost but 14 per cent out of 214 cases, and Follenfant noted but 3·67 per cent fatalities out of 945 cases in the Russo-Japanese War. These cases, like those of the British, were probably studied in hospitals at the base, unlike ours, which included cases from the line of battle, and field and base hospitals.

In some cases of injury toward the periphery of the lung there are but few symptoms. Shock is marked in proportion to the amount of injury to the chest wall Pain is greatest with fractured rib and pleural involvement. Hæmoptysis appears in about 75 per cent ; it is usually scanty, lasting three or four days, and seldom requiring treatment. Cough is slight and generally of short duration. Hæmothorax is present in nearly all cases of pleural involvement ; but it is never serious except when the amount of hæmorrhage is copious and persistent. In slight cases the blood is absorbed early, and convalescence takes place at once. The large effusions more often emanate from the chest wall. Pleurisy and pneumonia are rare. Abscess is also rare, and when present is associated with the presence of foreign bodies, like clothing, spiculæ of bone, lodged balls, or metallic fragments.

A clean dressing and rest are the principal indications in the treatment. The practice with military surgeons in recent wars has been to delay transport of chest cases until healing has taken place and the danger of complications has gone by. When blood is present in the

pleura in quantities to embarrass the heart and respiratory movements, it may be partially removed by aspiration. This operation promotes absorption, and if necessary, it may be repeated a second and even a third time. In failure of absorption of large quantities of clotted blood, or when a hæmothorax undergoes infection, the treatment for empyema (incision, resection of rib, and drainage) is in order.

Fractured rib by reduced calibre bullets is not so frequent as formerly. Antero-posterior shots are often attended by notching of the edge of the bone only, or the small bullet may slip between the ribs without bone lesion. Gunshots of the sternum and costal cartilages are attended with clean-cut perforations. The same is true of the majority of gunshots of the scapula, whilst fracture of the clavicle is attended by more comminution on account of its compact nature. Longitudinal shots with complete fracture of several ribs are not uncommonly seen now that men fight in the prone position. Such cases show marked comminution. Loose spiculæ should be removed, and the chest should be immobilized in all cases. The patient should be kept quiet in the prone position, and propped up enough to insure comfort.

Owing to the superior penetration of the modern bullet, **Retained Bullets** are not as frequently seen as formerly. No attempt should be made to remove a missile unless it causes annoying symptoms. Missiles lodged in the chest wall, if removed, should be extracted under strict antiseptic precautions, lest the disturbance about the pleura set up sepsis. Unless causing untoward symptoms they should not be removed. Bullets inside the pleural cavity which cause pain and irritation may be removed after satisfactory location with the *x* ray. Projectiles imbedded against the spine and in lung tissue should be left alone.

The symptoms of **Wound of the Heart and Pericardium** are : great distress, irregular action of the heart, syncope, dyspnœa, and severe pain about the cardiac area. Holt and many other observers in recent wars have time and again reported gunshots of the chest in the cardiac area, in which it seemed impossible for the heart and pericardium to have escaped injury, wherein patients have made unexpected recoveries, and in whom the symptoms were sometimes practically negative. Many writers have questioned the occurrence of actual heart lesion in such cases. We know that the literature of stab wounds gives many instances of recovery after injury by cutting instruments. The small pointed bullet in present use inflicts a wound in soft parts that is not unlike an incised wound ; and if patients can recover after injury from knife wounds, it seems reasonable enough that they can recover from injury by the small pointed bullet. Paracentesis is in order when the symptom points to the presence of blood or septic matter in the pericardium. The needle should be inserted two inches to the left of the median line in the fourth or fifth interspace, pushing it continuously until no further resistance is encountered, when fluid will appear if present.

Gunshot Wounds of the Abdomen.—Abdominal wounds include contusions, non-penetrating flesh wounds, penetrating wounds of the abdominal cavity, and perforating wounds of the abdomen. Contusions and non-penetrating flesh wounds need not occupy us, as they heal rapidly under modern conditions.

Penetrating gunshot wounds of the abdominal cavity include those which penetrate the peritoneal cavity without inflicting injury to omentum, mesentery, or viscera. Strictly speaking, this class of lesion must be very rare. It might be more in accordance with actual conditions if the omentum and mesentery were excluded from the classification. Military surgeons have so often seen recovery of gunshots of the abdomen with few or no symptoms in recent campaigns, that the possibility of a reduced calibre bullet penetrating the intestinal area without injury to the lumen of the gut has been advocated as a most likely occurrence. Whether the lumen of the gut or other viscera are included in the lesion or not, the fact nevertheless remains that a certain percentage of wounds of the abdomen in which the intestinal area has been traversed get well, with few or no severe symptoms, more often now than they did before the change in armament. In this connection the case of Major Thornburg, U.S. Army, is of special interest. A ·30 calibre U.S. Army service bullet entered the abdomen 5 cm. to the left of and 2 cm. above the umbilicus. The wound of exit, 1 cm. in diameter, was located directly above the left posterior superior spine of the ilium on a level with the umbilicus The injury was self-inflicted, the muzzle being held against the body. There were fifteen wounds of the ilium, three of the descending colon, numerous wounds of the mesentery, but no complete intestinal perforation. Twelve ruptured vessels were found. The intestinal wounds consisted of destruction of peritoneum and muscular coats only. *Plate LXVIII* depicts the character of the lesion in the denuded and lacerated intestine. Denudation of the peritoneum was no doubt caused by the cone of fire. The denuded surfaces were in all instances covered by omentum, as shown in *Plate LXIX.* The patient was drained front and back, and made a good recovery.

Perforating gunshot wounds of the abdomen include lesions of the peritoneum and some contained viscera. The wound of entrance is most frequently located on the anterior surface of the abdomen, especially in civil practice, whilst in military surgery the greater penetration of the projectiles permits them to enter the abdomen from distant parts like the buttock, neck, or thorax. Protrusion of the intestine or omentum is seldom seen from wounds by projectiles from hand weapons. The character of the lesion is largely influenced by the factors of velocity and sectional area on the part of the bullet, and the amount of resistance on impact. The latter is especially variable, depending as it does on the amount of fluid in the hollow organs. Transverse wounds in the gut are smaller than those directed obliquely. Perforation of the small intestine in military practice is often occluded by the natural redundancy of the mucous coat, which fills the wound

like a hernia, thereby preventing escape of gas and fæcal contents. In intestinal wounds, hæmorrhage is only prone to occur in lesions of the mesenteric border, while wounds of the mesentery proper, the omentum, and the solid viscera, are very apt to be followed by hæmorrhage. Injury to vessels in the abdomen, by the reduced calibre bullets, that cut like a knife, plays a significant part in the toll of death on the field of battle. Wounds of the urinary and gall-bladders are followed at once by extravasation of their entire contents. Wound of the stomach is accompanied by partial extravasation only, unless the wound is large.

Rules to be remembered when in presence of a Gunshot Wound of the Abdomen.—(1) The outcome is problematical. (2) The exact lesion is uncertain. (3) All wounds are septic, from (*a*) the clothing, (*b*) skin, (*c*) the projectile, (*d*) extravasation when present. (4) Complications are uncertain. (5) When the abdominal cavity has been penetrated, visceral perforations are present in 97 per cent of the cases. (6) A bullet crossing the intestinal area may do so without perforating the gut, but perforation is the rule. As many as twenty-eight perforations have been recorded in one case. Multiple perforations occur mostly in the ilium, from transverse and oblique shots disposed from flank to flank.

The outcome will depend on the nature of the injury, the amount of hæmorrhage, the character of the infection, and the presence of extravasation from the intestines, stomach, and urinary and gall-bladder.

In the presence of a gunshot wound of the abdomen, the military or civil surgeon must decide at once as to the necessity for **Operation.** As a rule, when the environments permit, an exploratory operation should be done through a free median incision. Bleeding should be arrested when present, after which repair of perforations should be attended to. Hæmorrhage from the liver is usually controlled by catgut or tape suture. Hæmorrhage from the spleen which cannot be controlled by ordinary means demands splenectomy. Extensive wounds of kidney tissue are treated by nephrectomy. Lesser wounds of the solid viscera may be treated by suture and posterior drainage. Complications which militate against operation are : A moribund condition or increasing shock ; the lapse of twelve hours or more after operation (but the surgeon's judgement should guide) ; the presence of peritonitis ; unfavourable environment, or inexperience on the part of the surgeon and his assistants ; complications (as severe wound of chest) which contra-indicate the use of an anæsthetic. Operation should be withheld in cases of eighteen to twenty-four hours' duration when the patient is doing well, as often happens in military practice ; and in active campaign when facilities for abdominal work are wanting.

When the patient's condition permits, all cases of protruded intestine, soiled with dirt and fæces, require immediate operation regardless of the surroundings ; in the presence of internal hæmorrhage, laparotomy is indicated though the environment forbid ; when the ball has passed through the intestinal area, if seen early enough and the surroundings permit, laparotomy should be performed.

Injury to Blood-vessels.—The increase in velocity, the reduction in calibre, and jacketing of the military rifle bullet, have added to the percentage of injuries to blood-vessels. Hæmorrhage in the body cavities, where the vessels are unsupported by muscles or fascia, takes place without restraint, and death from internal unavoidable hæmorrhage is said to be more frequent in the wars of the present day.

Injuries to blood-vessels consist of: (1) Contusion; (2) Partial; or (3) Complete division.

Contusion of a vessel may end in necrosis of the coats, or a thrombosis at the injured part. More severe contusions may be followed by traumatic aneurysm; or, in the presence of infection, secondary hæmorrhage may be the result. Partial or complete division of an artery by the new bullet, unless the vessel is superficially placed, is very often a cause of traumatic aneurysm. Vessels are no longer pushed aside as they were by low velocity lead bullets. The high velocity bullets may cut a notch in the side of the smaller vessels; or in the case of large vessels, two circular openings are made in the opposite walls. In vessels of the extremities such a traumatism may or may not be followed by external hæmorrhage. Most generally the narrow channel made by the bullet is interrupted by a change in the alignment of the apertures in the different layers of muscles, intermuscular septa, and other soft parts, with resulting hæmorrhage into the tissues, which are in turn dissected by the blood-pressure. Interference with the venous circulation and a rise of temperature from absorption of fibrin ferment, soon appear.

The result of such a condition is generally a **Traumatic Aneurysm** of the diffuse or circumscribed variety. The latter is more apt to occur in locations with dense tissues like the popliteal space, in which the tumour is of small size, seldom larger than a hen's egg, and very firm. The circumscribed aneurysm is less serious than the diffuse variety. The treatment is rest, during which the tumour contracts, and occasionally disappears. The usual outcome, however, is toward gradual enlargement and final rupture. Sooner or later operative treatment, consisting of ligation above and below the seat of injury with dissection of the sac, becomes necessary. When this is impracticable, Anel's or Hunter's operation should be practised. The treatment of diffuse aneurysm should be delayed if possible until healing of the external wound, in order to minimize the chances of infection, after which direct incision and ligation of the vessel at the point of injury should be practised.

Military surgeons report an increasing number of the other forms of traumatic aneurysms as a result of arteriovenous communications. These communications are more or less characteristic of gunshot wounds, and their frequency is due to reduction in the calibre of the new bullet, which permits it to pass between adjoining vessels, notching both; or the projectile may pass the line of an artery and vein, grazing both surfaces, when an aneurysmal varix, or more frequently a varicose aneurysm, develops later. Rest in bed, which is to be pro-

longed in accordance with the progress of the case, is the important treatment for aneurysmal varix. In the military service a plaster-of-Paris splint is especially indicated when the vessels of a limb are involved. The brachial and its accompanying vessels offer the best results for operative treatment. Vessels of the forearm seldom show serious symptoms. The tibial vessels may be operated upon with safety. It is the rule not to operate on the femoral or popliteal vessels except in cases of necessity. The most effective operation in any arteriovenous communication is ligation of the artery above and below, as near as possible to the point of communication, without interference with the vein. Proximal ligation is not recommended, as it is apt to be followed by gangrene. When rupture of the sac in varicose aneurysm is impending, the treatment is the same as in traumatic aneurysm of the diffuse kind. In arteriovenous communications in the neck, ligation of the main trunk on the proximal side of the communication should be practised, and this should only be done when made necessary by the increasing effects of pressure from dilatation of the vessels or extension of the sac in varicose aneurysm.

Gunshot Wounds of Joints.—Like the gunshot wounds of soft parts and lung tissue, gunshots of joints by the new military hand rifle are most humane. This is especially true of the ogival-headed bullet, and it is equally true of the pointed or 'spitz' bullet when this makes a regular impact. Shots traversing the joint perpendicularly, inflict a minimum amount of injury. Long oblique tracks through the bony parts of a joint have more traumatism and exhibit greater liability to infection. This latter tendency is measured by the size of the external wounds and the degree of traumatism to the joint structure. The cancellous bone tissue offers but little resistance. The lesion in a joint by armoured bullets is marked by a clean-cut perforation, at the proximal and mid ranges, with little or no tendency to fissuring or splintering of bone. Gunshots of the hip- and knee-joints, which gave such fatalities when inflicted by the old armament, are now the most amenable of the bone lesions when promptly treated by a proper field dressing and fixation. This is practically true of all joint wounds by armoured bullets making complete perforations. In the remote ranges, or when bullets have a low remaining velocity from ricochet, lodgement is apt to occur, as shown in *Plate LXX, Fig.* 14, where a Turkish 'spitz' bullet in the Turko-Balkan War is lodged in the knee.

At the battle of Santiago we had 17 gunshot wounds of the knee by the Spanish Mauser with no death. Of the men hit, 14 were returned to the colours in the course of a few months, and 3 were finally discharged for disability. In the Anglo-Boer War there were 95 cases of knee-joint wounds with a mortality of 4·2 per cent, but 11·5 per cent of the cases were the result of injury by shell fragments, among which the fatalities took place. The remaining cases were no doubt due to injuries by the hand-rifle projectiles, mostly of reduced calibre, and among these no death occurred, thanks to armoured bullets and antiseptics.

Gunshot Injuries of the Diaphyses of the Long Bones.—Gunshot fractures of the long bones are frequent in war; they are nearly all infected. They are classed among the serious wounds, and they offer many difficulties in transport. The liability to the development of infection is in proportion to the degree of traumatism. As a rule the comminution of bone is found to increase with the velocity of the projectile, its sectional area, and the resistance which it encounters on impact. There may be a simple grooving or guttering of bone, or a perforation with long subperiosteal fissures. When explosive effects are present from proximal shots against compact bone, the foyer of fracture exhibits bony sand, which is driven into the tissues in all directions; large fragments are found partially or completely detached and displaced at some distance. The wound of entrance in the skin is about the size of the projectile inflicting it; but the wound of exit will be found irregular, measuring as much as three and four inches in its longest diameter. The space from the point of fracture to the exit wound in the skin is conical in shape, the base of the cone corresponding to the wound of exit. (*Plate LXX, Figs.* 15, 16.)

Conservation should be practised in all gunshot fractures of long bones, except those in which the necessary blood and nerve-supply have been destroyed. In accordance with our present methods of treatment, we look for consolidation of fragments however numerous, provided they are still attached to periosteum or to soft parts whence they obtain their blood-supply. Moreover, we look for union where loss of substance in the continuity of bone is as much as one or two inches, because nature will fill the gap with callus in time. But absence of sepsis is requisite for this beneficence on the part of nature. The wound should be thoroughly cleansed with soap and water, or, in the absence of water, as in the emergency conditions of field work, a 50 per cent solution of weak tincture of iodine should be freely employed. The exit wound should be enlarged if necessary, and loose fragments entirely removed. Adhering fragments should be restored as near as possible to their normal position. The wound should be dressed antiseptically, and a drain put in place for twenty-four to thirty-six hours. The limb should next be immobilized by the splints usually employed in surgical practice, but plaster-of-Paris splints are generally preferred in military surgery. Exploration to remove fragments is unnecessary in the minor degrees of fracture. Such cases only require a clean dressing and fixation.

Immobilization in all gunshot wounds, wherever it can be applied, plays a great part as a prophylactic against infection. It lessens pain, and insures comfort to the patient; but it is of special value in gunshots of the long bones, whether fracture is present or not. Aside from the advantages just mentioned, immobilization prevents completion of a partial fracture where guttering has occurred or a perforation with long subperiosteal fissures is present without displacement or complete solution of continuity. Bone lesions such as those just mentioned are not uncommon by the armoured bullets at the ordinary

battle ranges. They may occur in the middle of the shaft of a long bone, or in the tissue which marks the border line between the epiphysis and diaphysis. We have seen sad results from the failure to employ fixation persistently and continuously in just such lesions.

II. WOUNDS FROM THE ARTILLERY ARMS.

Wounds from the artillery arms in modern wars principally come from shells and shrapnel fired from 3-inch field guns. Wounds from hand grenades, which have lately come in favour, and from machine guns, are also put in the class of artillery wounds when computing the percentage of injuries by the different arms. *Machine guns* fire the military hand-rifle ammunition, and the characteristic features of the wounds from this source, and the treatment, are therefore the same as those from the hand rifle.

Shell wounds occur more often from fragments of bursting shells. In the limbs such wounds bear resemblance to those seen in civil practice from machinery or railroad accidents, and they require the same care and treatment. These wounds are generally classified as contused, penetrating, perforating, lacerated, or mutilated wounds, and burns. The latter are most frequently seen from the artillery fire on board ship.

Shrapnel wounds are by far the most frequent of the so-called artillery wounds. They may result from part of the casing of the shrapnel, but more frequently they are inflicted by one or more of the round lead half-inch balls that fill the case. The characters of the wounds these balls inflict are not different from the wounds of the old-time round balls from smooth-bore hand weapons. The bullets are very apt to lodge, and the wounds are all infected. The body wounds are very fatal. In the battles of Lule Burgas and Kirk Kilisse in the recent Turko-Balkan War, the percentage of wounds by shrapnel balls is placed by various observers at 60 to 90 per cent. In the conflict that is now raging on the Continent of Europe, the reporters all agree that the percentage of wounds, which has hitherto favoured the hand weapons by an average of 60 per cent, is now about to be reversed in favour of the artillery arm.

The treatment of wounds from this source in the various bodily regions does not differ from that already noted. The prime condition to combat is infection. To this end the first dressing should be sterile, applied over a surface that has been painted with a 50 per cent solution of weak tincture of iodine. No attempt should be made to disinfect the wound proper until the patient has been placed amid favourable surroundings. Exploration by probe or finger should be withheld. Transportation of fractures should be delayed when possible. Fixation should be practised at once, and in all bone lesions, with or without fracture, immobilization should be maintained until time for union has elapsed.

Among the virulent infections, **Tetanus** plays an important rôle in war wounds. When it appears with increasing frequency, as in some campaigns where the soil is rich in manure, prophylactic injections of

tetanus antitoxin should be unhesitatingly used in all gunshot wounds. Infection from *Bacillus aerogenes capsulatus* and other gas-producing organisms is also common enough in gunshot wounds. This bacillus, like that of tetanus, thrives best in wounds which are rich in hæmatomata, and in this regard they both find the mutilated tissues from gunshot a fit soil for their development. The treatment for **Gas-bacillus Infection** is free drainage, continuous hot-water baths, or amputation.

Hand grenades inflict lacerated and multiple wounds not unlike those of shell fragments or the high explosives which compose the bursting charge. The reporters in the Manchurian campaign found these wounds difficult to treat satisfactorily. *Plate LXXI* shows the grenade used in the U.S. Army, and the number and character of fragments after bursting.

III. BAYONET WOUNDS.

Until recently, bayonet wounds, and wounds by cutting implements of the side-arm class, have been so infrequent that reference to them has received little attention. It was supposed that the rapidity and deadliness of fire from magazine rifles, machine guns, and shrapnel had made bayonet charges impossible. Experience in the Russo-Japanese War and the present European War has shown over and over again that it is possible for well-seasoned troops to use the bayonet effectively at certain critical moments in battle, and the casualties from such a source have now attained renewed importance.

The majority of armies carry a knife bayonet, about 18 inches in length, with one cutting edge like a small sword. Other armies, like the French, carry a bayonet with four longitudinal projections separated by four corresponding grooves. The character of wounds from the knife-bayonet does not differ from that of stab wounds encountered in civil communities. The gravity of the wound will depend on the depth and size of the wound as well as the anatomical structure involved. Wounds of vessels in deep punctures end in hæmatomata or diffuse aneurysm. Vessels, nerves, and tendons may be cut, and bones fractured. The treatment of these conditions will be the same as that observed in similar traumata in surgical practice.

The old-time bayonets with longitudinal projections on the sides cause punctured wounds which favour the lodgment of foreign bodies, with resulting sepsis. The contused and lacerated tissues favour the development of deep-seated inflammation, which requires great care in the management of each case. When hæmorrhage persists, the wound should be enlarged and the bleeding vessel secured above and below the seat of injury. The wound should be cleansed of blood-clots and other matter by free irrigation with mercury bichloride 1–4000. The subsequent management of the injury should be directed toward the prevention of sepsis. In old septic wounds, irrigation as far as the bottom of the wound with weak tincture of iodine (1 dr. to a pint of water), repeated as often as necessary, with free drainage if called for, will soon clear up the infection.

ANTISEPTICS IN WAR, AND THE METHOD OF THEIR APPLICATION.

BY

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THIS war has conferred a benefit upon humanity by resurrecting antiseptics from the limbo of the past to which so many surgeons had condemned them. This fact has stimulated fresh research into the action of antiseptics of all kinds. Most matters connected with them, and the manner in which they accomplish their end, require a great amount of prolonged investigation. The contents of this article will show how difficult are the problems, and how far away are the answers to many fundamental questions. Definite statements must not be expected at this period, for many important factors are still in the melting-pot of experimental research.

The following observations are founded upon preliminary work by Dr. Paul Fildes, Dr. L. Racjhman, and the writer, who are conducting an investigation on antiseptics, under the authority of the National Research Committee. Matters will be simplified if it is stated at once that anything new or worthy of consideration which this article contains is based upon the work of my two colleagues.

During the South African War, I applied to recent and older wounds a paste composed of double cyanide of zinc and mercury and a water solution of carbolic acid 1–20. The salt is an inhibitor and the carbolic acid is a germicide. The paste soon dried and the wounds did well under its action ; in fact, the only shell wounds seen which were not septic were those treated with this paste. It was applied both to the wounds and freely on the surrounding skin. On returning home in 1900, I drew attention to the advisability of applying to wounds in war an antiseptic, instead of relying only on the application of an antiseptic dressing which was totally insufficient. It was then thought that if the paste were placed in collapsible pure tin tubes it could be squeezed out when necessary, and would form a useful addition to the equipment of those who treat such wounds. I have some tubes which were filled at that time, all of which are still in perfect order. Upon the outbreak of the present hostilities, attention was again drawn to these previous statements and several fresh tubes were filled. Many of them became corroded. Matters need not have ended there, as tubes made of other material could have been filled. The fact which has led to the abandonment of the double cyanide of zinc and mercury powder is, that many samples now contain free cyanide of mercury ; this element of the salt has

been increased during recent years to as much as 38 per cent. Therefore, until manufacturers can guarantee a purer article, its use can no longer be advised. This is to be regretted, because it proved itself in many ways a serviceable paste. In particular, it soon dried in the wounds and in the surrounding skin, as it was not composed of any medium which remained moist. The double salt was valuable because it was so slowly soluble in serum, and therefore its action lasted for a very long time, and formed a depôt in the wound from which a constant supply of the drug could be extracted. The drawback to the salt was that it was only an inhibitor and not a germicide, a fact which rendered necessary the addition of the carbolic-acid element. The property of this depôt action is one of the features desired by one who searches for an ideal antiseptic to apply to wounds in war, and indeed to any wounds where the possibility of infection is threatened at the time of their infliction or afterwards.

At this point it may be well to formulate the requirements desired in an ideal antiseptic :—

1. A germicide would be preferable to an inhibitor, and it should be capable of killing all micro-organisms, spore-bearing or otherwise.

2. Pain and irritation upon its application should be absent, or so slight and temporary as to be negligible. It should not be toxic.

3. The presence of fat should not enfeeble its powers, and it would be an advantage were it capable of dissolving fat. It should not coagulate albumin unless the precipitated albumin were capable of antiseptic action.

4. Slow solubility in serum is a property the value of which it is difficult to exaggerate. It renders possible the depôt action alluded to above.

5. It should be soluble in water. All known antiseptics are best when dissolved in water. The action of antiseptics even when applied dissolved in alcohol depends mainly upon the solubility in the water they meet with in the tissues or atmosphere. This fact justifies the question, "Then why dissolve antiseptics in alcohol?" Alcohol evaporates and dehydrates, and dry wounds are less liable to infective processes than wet ones. Therefore, if alcohol can be utilized as a solvent with sufficient amount of water to ensure efficient action, it is very desirable. Eighty per cent alcohol renders the solution efficient.

6. Sir Watson Cheyne, in the Hunterian Oration, 1915, makes a great point of the value of diffusibility of an antiseptic when applied with the object of purifying wounds recently inflicted, and where much blood-clot and damaged tissues are to be expected. It would be an advantage if the antiseptic could also penetrate undamaged tissues without harming them. This particular property was being investigated by us before Sir Watson Cheyne delivered the Hunterian Oration.

The following are the main occasions when the application of antiseptics is desired in war :—

1. To purify the skin. It is of great importance that the skin should be rendered sterile, for fear of organisms gaining access to the wound, whether that wound be pure or septic. Dressing applied over wound and skin can easily slip about from the skin on to the wound, so the skin must be kept pure.

2. To purify wounds which have been exposed recently to the possibility of infection. This is the class of wound to which the military surgeon should attempt to direct his practical attention at the earliest possible moment. It is very urgent, because the earlier after infliction that such a wound receives its cleansing the more successful will be the result of the purification.

3. To attempt to sterilize wounds in which infection has become firmly established is almost futile, as will be pointed out presently; the only good which the application of an antiseptic can do to such a wound is to evict the more or less non-pathogenic bacteria with which the pathogenic invaders are mixed. The application of antiseptics to such a wound is invaluable in keeping out fresh infective agents.

I have observed in wounds which had granulated, recent complicating infections of *B. pyocyaneus* eradicated by the application of perchloride of mercury 1–500, and also the gas-producing and spore-bearing micro-organisms which have complicated the wounds made in this war. But in neither class of case have the wounds been completely sterilized from all micro-organisms. The reasons for the partial success in both classes were probably these. In the case of *B. pyocyaneus*, although it is a pathogenic organism, we were able to apply the antiseptic before it had become established firmly in the wound. In the case of gas-producing and spore-bearing organisms, their eradication was rendered sufficiently easy, on account of the low pathogenicity which many of these micro-organisms possess, although they had inhabited the wounds in the early periods of their infliction. Hence success in dealing with this class of wound depends upon the time which has elapsed since the additional super-imposed infection occurred, and upon the pathogenicity of the super-imposed infective agents.

The writer has never seen a wound which has been infected only by a gas-producing and spore-bearing organism. In private practice he has seen a wound treated unsuccessfully with antiseptics when *B. pyocyaneus* had been fairly established. Vaccine treatment apparently was the means of curing this particular case.

Space does not permit a full attempt to discuss the value of many antiseptics, and we have not had sufficient time to complete any experiment upon even one of them which would warrant any definite statement. But one or two things may be said concerning carbolic acid and perchloride of mercury in relation to the properties enumerated which would belong to an ideal antiseptic.

Carbolic Acid is a germicide capable of diffusibility, as Sir Watson Cheyne showed by ingenious means of demonstration in his Hunterian Oration. It can kill staphylococcus under certain conditions in a

dilution of 1–120. It is soluble in water, and on application is not particularly painful or irritating, and its poisonous properties have been much exaggerated. In those cases where carboluria has appeared, the writer has never seen any harm result. In children carbolic acid is probably more toxic than to adults, and therefore should be employed with more caution. Applied to wounds in children, pure carbolic acid produces no toxic effect. Carbolic acid dissolved in oil loses its antiseptic property. Mixing with perchloride of mercury in a lotion lessens the antiseptic powers of both agents. Therefore the mixture has no compensating value. The exact action of carbolic acid as an antiseptic is not known. It may act as a molecule and be dissolved in the micro-organism. Carbolic acid in strong solutions forms albuminates in the tissues which are ineffective as antiseptics ; however, this does not interfere much with its use as an antiseptic, because the carbolic acid in these cases is always in excess. Carbolic acid 1–20 applied to the skin does not kill the spores of *B. subtilis* in five minutes when they are placed on its surface.

Perchloride of Mercury is a germicide, and acts probably by inducing a poisonous or coagulating effect on the protoplasm of the bacteria. Its action as an antiseptic is only possible when in a medium which allows ionization. Its solution in water 1–500 is one successfully used up till now to sterilize wounds recently exposed to infective agents. For example, I have never observed tuberculosis affect a wound made for the removal of tuberculous glands when, during removal, one or more soft infected glands have burst and their contents freely poured over the fresh wound. The immediate filling of the wound with 1–500 perchloride of mercury definitely prevents any infection of the exposed surfaces. On the other hand, where no antiseptic has been applied, wounds similar in character have become grossly tuberculous, and they have been opened and scraped in the attempt to induce a local curative effect. I have never seen the slightest indication of any toxic effects when using perchloride of mercury in the strength of 1–500 : to some people this is a cause of wonderment, especially when they hear that quite commonly I fill to overflowing the whole of the anterior and posterior triangles of the neck with the solution. On skin, in a solution 1–500 it will kill the spores of *B. subtilis* in five minutes. It is adsorbed by skin and will remain in a soluble condition for a long time. In wounds it is adsorbed by its own precipitated albuminate and is given up into solution slowly. Therefore it possesses a marked and most desirable depôt action. It does not penetrate in water solution, but does so freely when in solution in alcohol ; therefore a desirable medium is an alcoholic solution, about 80 per cent ; alcohol gives it sufficient water to enable it to exert its great antiseptic powers. Its full antiseptic powers are reduced by the presence of serum ; but, like carbolic acid in strong solution, enough of the drug is retained to render it an efficient antiseptic. Very far from the whole of the mercury put into a wound is con-

verted into the harmless and—antiseptically speaking—useless albuminate. However, though the white precipitate it forms in the tissues does not contain any free perchloride of mercury, it contains a quantity of mercury which is very readily dissociated and which does not form fresh albuminates. The coagulum produced in a wound when dissolved in serum has a marked antiseptic action, and will kill the spores of *B. subtilis* in a dilution of 1–750. The antiseptic action of the drug in the tissues is continuous so long as this adsorbed mercury is present. When a watery solution of perchloride of mercury is found on the skin, the oiliness of the cutanous surface causes the lotion to trickle away like water from the back of the proverbial duck ; but when the 1–500 perchloride of mercury is dissolved in 80 per cent alcohol and sprayed on the skin, the fluid is evenly distributed, even without the preliminary removal of grease by means of acetone or turpentine, etc.

To this alcoholic (80 per cent) solution of perchloride of mercury (1–500), I added carbolic acid (1–20), hoping thereby to make the mixture more penetrating; but my colleagues found, as before stated, that the antisepsis of the solution was diminished by this admixture. Rosalan was also added in the hope that this would render fixation to the skin more complete. Rosalan certainly fixes to the horny layer and nails ; but there is no evidence in support of its possessing the same property in other tissues. Rosalan is also an antiseptic, and its presence does not diminish the effect of the mixture. However, the supply of rosalan in this country depends on German industry, and at present cannot be obtained.

The addition of a dye to the solution serves a useful purpose by indicating exactly where the lotion has been applied and where the parts still require its presence. My colleagues suggested the addition of malachite green, and this was adopted for experimental purposes and found compatible in the strength of 0·25 per cent. It is itself an antiseptic, and will kill *B. subtilis* spores in five minutes. It is readily adsorbed and therefore exerts a depôt action. In serum it exerts its antiseptic properties notwithstanding the fact that its colour is bleached. Malachite green is non-toxic. The combination of this dye and perchloride of mercury does not diminish the antiseptic properties of the mixture, which is made up in the following strength : perchloride of mercury 0·25, malachite green (pure) 0·25, spirit (80 per cent) 100, and it should be applied with a spray.

Prior to working at Haslar, I thought a paste was the best means of treating wounds in war in their earliest stages. Now, however, after seeing Deputy Surgeon General Wildey's methods, I feel that in the use of a spraying apparatus we possess a more economical procedure. The lotion is not wasted by being poured into wounds, nor absorbed into sponges or swabs. A spray can direct the lotion precisely where it is wanted into all parts of the wound, and it renders possible the use of an antiseptic medium that rapidly dries. A paste made of greasy materials can be applied to the surfaces of

wounds only with difficulty and with much chance of infective manipulation, and the medium remains moist. If to this greasy vehicle a drug which is volatile be added for the purposes of antiseptic properties, the drug will evaporate and the greasy medium will remain.

In the present state of our knowledge it appears that the choice of an antiseptic for use in the earliest stages of wounds in war lies mainly between the drugs derived from the coal-tar series and perchloride of mercury. I have a very decided prejudice in favour of perchloride of mercury, a prejudice encouraged by the practical results of ordinary surgical procedure as set forth by the work of my colleagues, which has shown that the adsorbed mercury in the albuminate is a valuable antiseptic. Before they discovered this fact, we had been under the impression that the coagulum formed in the tissues rendered the drug impotent; now we know that this is not the case. Were it necessary, a paste could be made containing the perchloride of mercury, but on the whole I would much prefer the use of the spray as a means of conveyance of the drug to the wound. India-rubber in service kit of this kind is looked on askance; but its employment in spray-work should not be put on one side. Considering the immense amount of rubber used in tyres for motor vehicles, the quantity necessary for sprays would be trifling.

Finally, it should be remembered that malachite green and perchloride of mercury lotion serves all purposes necessary for treating wounds: (1) It sterilizes skin without evaporation of the antiseptic; (2) It sterilizes a recently infected wound and leaves in the wound a depôt from which antiseptic could be drawn for a long time after; (3) It keeps an old wound from fresh infection, and possibly eradicates some of the organisms of feeble pathogenicity; (4) It can be sprayed on to the dressing and made an absolutely efficient protection to the discharges from the wound as well as a guard to the wound itself; (5) Nothing will be added to the skin or wound to keep it moist: in fact, all the tendency is to keep it dry.

We have not been able to complete our investigations with either of the above two types of antiseptics; they are being continued. Therefore it goes without saying that extended trials have not yet been made with iodine, salicylic acid, ether, hydrogen peroxide, and various other drugs which are each in turn becoming the objects of strong support.

Part IV.—Miscellaneous.

PUBLIC HEALTH:

INCLUDING

I. MEDICO-LEGAL AND FORENSIC MEDICINE.
II. STATE MEDICINE (INCLUDING LEGAL DECISIONS).
III. INDUSTRIAL DISEASES AND TOXICOLOGY.
IV. SCHOOL MEDICAL SERVICE.

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I. MEDICO-LEGAL AND FORENSIC MEDICINE.

ALLEGED NEGLIGENCE OF MEDICAL PRACTITIONER.

In the Court of Session, an action against a medical practitioner was heard for negligence in treating a patient, who had received an injury to her finger whilst pruning trees. The little finger was cut deeply, was washed and dressed, and on the following day the patient called in a practitioner, who diagnosed 'poisoned finger.' The pain and swelling increased, and the patient went to consult an expert in Glasgow, with the result that the finger was amputated. The practitioner denied fault or negligence or failure in skill as regarded treatment, and the Jury returned a verdict in his favour.

HERBALIST ACTING AS APOTHECARY.

A herbalist was convicted at a County Court for acting and practising as an apothecary, in that he attended a patient for an internal abscess, prescribing various medicines. The patient died, and an inquest was held, the cause of death being certified as kidney disease. The herbalist was convicted and fined £20 and costs, at the suit of the Apothecaries' Society, under the Apothecaries Act, 1815. On appeal, the appeal was dismissed by the King's Bench Division, and refusal was given at the same time to a further appeal.

NEGLIGENCE IN A NURSING HOME.

An action was heard in the King's Bench Division against a medical proprietor of a nursing home, wherein the plaintiff was under treatment, consisting amongst other things of hypodermic injections of a hypnotic or sedative. Hot-water bottles were left in the bed close to the patient after he was under the influence of the hypnotic or sedative, with the result that his skin was scorched. He claimed

damages, and the Jury awarded him £100, to be paid by the medical proprietor, who was thus made responsible for the action of his nurses, though he himself was not treating the patient, and though the Jury found, in their verdict, concurrently, that he was not himself guilty of negligence.

Intensive Culture (Gardening) and Fly Nuisance.

An important case was settled in the Chancery Court (Bland *v.* Yates), judgement being given against a gardener, who carried out intensive culture, using large quantities of manure, in which flies bred, thereby causing a nuisance to a neighbouring house. The French system of intensive culture necessitates the stacking of manure in large quantities prior to use, and such a process was liable to produce a nuisance (both directly by smell, and indirectly by flies, which breed in manure) to a greater extent than would be the case in ordinary market gardening. An injunction was granted, although the district was a market-gardening one.

Verminous Children under the Children Act.

A Magistrate decided that, in the case of a verminous child, the father had unlawfully neglected it in a manner likely to cause it unnecessary suffering or injury to health. The father was, consequently, fined. In another case it was decided that the cutting off of a few hairs for purposes of examination under the microscope in connection with a suspected verminous head, was not an assault for which an action might lie against a medical officer or nurse.

Interpretation of an Agreement.

In the case of Eastes *v.* Russ, an interesting point was under consideration, viz., the right of a partner or principal to bind down a partner or assistant not to practise within the particular district for a stated time. The work was that connected with a clinical research laboratory, and one of the conditions of agreement was not to carry out similar work within a distance of ten miles; but no time limit was mentioned, and the question before the Court was whether such should refer to the duration of the partnership or assistantship or to the partner's or assistant's lifetime. The Court *held* that the partner or assistant could not be barred *permanently* from practising within the stated district. The case was taken to appeal, and the same decision was arrived at, the reasons given being (*a*) the interests of the public, and (*b*) the need for ensuring that all competition in the particular district was not excluded.

Definition of a Provident Dispensary.

The County Court Judge *held* that a Medical Officer of a provident dispensary was only entitled to charge 1s. per tuberculosis notification under the new 1912 Regulations, in that such medical officer was paid by the Society, and not by the members individually, and his remuneration fixed according to the number of cases treated. The Provident Dispensary (Coventry) came within the definition of the word 'hospital.'

Action by Medical Superintendent for Libel.

In the King's Bench Division, an action for libel against a paper was brought by the medical superintendent of a Poor-law infirmary, who was accused, in the libel, of cruelty in flogging convalescent boys in an infirmary. It was not disputed that punishment had been inflicted with an instrument consisting of five strands of moderately thick string, but it was held that the propriety of corporal punishment in the infirmary was a matter for the authorities (the guardians) and the Local Government Board. Without expressing any opinion as to the necessity or advisability of corporal punishment being administered in an infirmary, the jury awarded a verdict for the plaintiff, with damages £100.

Operations in Hospitals.

A County Court Judge decided that a hospital, though maintained by voluntary subscriptions, was not compelled to give *free* treatment to an applicant, who stated that he was in receipt of a salary of 2 guineas a week. The case was a claim for £17 for an operation performed at a hospital by a local medical practitioner. In law, hospitals are only free for the very poor—persons who are practically without means.

Workmen's Compensation Act.

Several interesting decisions have been given during 1914 under the Workmen's Compensation Act, and these may, with advantage, be put on record for convenient reference, as follows :—

1. Disease versus Accident.

a. Obesity as an Accident.—A miner was injured by a fall of coal and, as the result of such accident, did no hard work, with the result that a natural tendency to obesity increased (his age being 63 years). It was claimed that, for this reason, the man was less fit for labour of any kind, and that he could only now engage in a sedentary occupation. The Sheriff Substitute found that the incapacity for work had ceased, but the Lord President and the Court of Session, on appeal, reversed the decision, giving it as their opinion that, when the immediate effect of the accident had come to an end, the man was unfit to resume his former employment. The House of Lords reversed the decision of the Lord President and the Court of Session.

b. Nystagmus as an Accident.—In the case of Cannon *v.* Shelton Iron, Steel & Coal Company Limited, the question was raised as to whether or not heart failure (causing death) could rightly be attributed to nystagmus, a disease scheduled under Section 8 of the Act. The Judge decided against the plaintiff. On post-mortem the heart muscle was found to be flabby, whilst there were signs, too, of commencing pneumonia and old pleurisy. The muscles of the body were fairly well developed. Death took place during an attack of retching, that came on a few hours before death. The Judge's finding was practically that the heart failure was not due to the nystagmus, and that the 'retching' was not a symptom of the nystagmus, from which the miner had suffered for the last six months.

c. General Paralysis of the Insane as an Accident. — A labourer met with an accident, and was awarded compensation. General paralysis of the insane supervened, and the County Court Judge *held* that this was one of the entire results causally connected with the injury, the worry of the accident having worked on the over-susceptible brain, and thereby caused the general paralysis to develop.

d. Contracted Granular Kidney as an Accident.—A man met with an accident, and afterwards developed symptoms of chronic kidney disease, from which he died. The County Court Judge *held* that the accident (fall from a ladder) had weakened the man's power of resistance to the disease from which he mortally suffered. (WOOD *v.* SUN INSURANCE OFFICE).

2. MISCELLANEOUS POINTS.

a. Value of One-eyed Workman.—Is a miner, who has lost the sight of an eye owing to an accident, entitled to refuse to resume his former occupation, on the ground of the risk involved? The Edinburgh Court of Session answer the question in the *negative*, on the reasoning that the man's incapacity, due to the injury to the eye, had ceased, and that his wage-earning capacity was unimpaired. Further, in the opinion of the Lord President, the risk of another accident had not been increased by the man's loss of one eye.

b. Malingering under the Act. — The Birmingham County Court Judge terminated an award under which a girl was receiving compensation from her employers for the alleged results of an accident. Whilst scissors-setting, some filings flew into her eyes, so that, as the patient stated, she had suffered from inflamed eyes and had lost her sight. The eyes were covered by a medical attendant with metal discs in such a way that these would have shown if they had been tampered with. Covered in this way for a few days, all signs of inflammation had gone, the eyelids, however, for the purpose of examination, having to be opened by force, and the eyeballs brought into a normal position with forceps.

c. Liability under the Act.—A potter suffered from lead poisoning, from which he died. A claim was made against the firm employing him at and before (three months) the time of his death, and against another firm, with whom he had been employed some time before (twelve months), suffering then also from lead poisoning. The County Court Judge held that there was no evidence that the death had been accelerated by the man's employment with the former firm, and that the man's employment with the latter firm had been more than twelve months before death, so that neither firm was liable! This decision was upheld on appeal.

II. STATE MEDICINE, INCLUDING LEGAL DECISIONS.

Antityphoid Inoculations.

The War has emphasized one fact—the value of antityphoid inoculations. Their object is to render the person inoculated proof against contracting the disease if, and when, exposed to infection. A state of (*a*) active or (*b*) passive immunization is aimed at—by introducing into the circulation a substance that will (*a*) stimulate nature to throw out antibodies, or (*b*) directly antagonize the toxins of infection. In practice, so far as typhoid fever is concerned, the *active* immunization is the valuable one—the injection of dead typhoid bacilli or their products into man, as suggested first by Sir Almroth Wright (in England) and Pfeiffer (in Germany).

What has been the practical result? A large mass of statistics has been got together, and the deductions that can be safely drawn therefrom are noteworthy. It must be remembered, however, that typhoid fever occurs occasionally a second time in the same person, so that we must be prepared for cases of typhoid fever occurring amongst inoculated persons. Among 10,378 inoculated men, 56 cases of typhoid occurred, i.e., 5·4 per 1000; whilst among 8936 uninoculated men, 272 cases of typhoid occurred, i.e., 30·4 per 1000. What are the bad results that may arise from the operation of inoculation? A severe reaction may follow, but, as a fact, very rarely does. Antityphoid inoculation is, therefore, of first-rate military importance, and why it is not made compulsory in the Army is one of those mysteries to which we are getting more and more accustomed in England. The extract from the First Army Central Force Orders by General Sir Bruce M. Hamilton, K.C.B., K.C.V.O., Commanding, is noteworthy. It is as follows: "In the South African War there were 57,000 cases of typhoid fever, of which 8000 died, more than were killed by the enemy. In India the deaths from enteric fever amongst the troops used to be 800 and more a year. Now 93 per cent of the troops are inoculated, and the deaths from typhoid have fallen to less than 20 a year. In the United States Army, where inoculation is now compulsory, out of 90,000 men, last year there were only 3 cases." Despite these facts, the National Antivaccination League have transferred their energies from small-pox to typhoid fever under the heading of "War Office Conspiracy against Liberty"!

Tuberculosis and Domiciliary Treatment.

The problem of domiciliary treatment has been emphasized recently, and the views that have been expressed in regard thereto are coming more and more into prominence. It is a matter for the general practitioner, who can call to his assistance the tuberculosis medical officer and the tuberculosis nurse of the district. The aim of domiciliary treatment is to bring the patient's immediate surroundings and way of living into as close accord as possible with sanatorium practice—to continue at home the lessons learnt in the sanatorium (with its hygienic-dietetic conditions). A separate bed and a separate room, with as few articles of furniture, carpets, curtains, etc., as possible, are needed. Windows and door should remain constantly open. The question of exercise requires consideration—over-exercise being

specially dangerous as causing excessive auto-inoculation. The amount of exercise must depend upon the patient's temperature and sense of well-being. The greatest trouble arises in connection with lack of proper nourishment, despite the sickness benefit, the 'accessories' allowed by the Insurance Committees, and the Poor-law relief. Shelters are valuable adjuncts to home treatment where circumstances allow. The problem is one of hygiene, not of treatment.

Tuberculosis and its Infectivity.

Much has been heard as to the infectivity of tuberculosis, and the report on the subject by the Royal College of Physicians is worthy of being placed on record. It is to the following effect :—

1. Tuberculosis is an acquired disease, but certain constitutional types may be inherited, which render the patient specially susceptible to infection, and there is reason to think that such susceptibility is an inherited character.

2. The infective agent is the tubercle bacillus. This may be contained in the various discharges and excreta of the patient, and especially in the sputum of those suffering from pulmonary tuberculosis. No discharge is infective unless it contains the tubercle bacillus.

3. Cases of tuberculosis of bones, glands, and internal organs, from which there is no discharge, or which do not furnish any excretion, and cases of arrested pulmonary tuberculosis, have never been proved to be infectious. (By 'arrest' is here meant that all the symptoms and physical signs of activity have disappeared, and the sputum has either ceased, or no longer contains tubercle bacilli).

4. The means by which tubercle bacilli may enter the body are :—

a. By Inoculation through a wound or abrasion of the skin. This has occasionally occurred to workers in laboratories, post-mortem attendants, and others dealing with tuberculous material, and is presumably the way in which lupus is acquired.

b. By inhalation.—Susceptible animals are readily infected by the inhalation of air containing tubercle bacilli, whether in droplets or suspended as fine dust, but in the spread of the disease amongst human beings, the latter appears to be the more important means of infection. The sputum or other discharges, whether on soiled handkerchiefs, linen, garments, or elsewhere, when dried, may become pulverized, and in this condition may be readily dispersed in the air of a room. That droplets of sputum are less important agents of infection is suggested by the fact that the incidence of consumption upon the staff, nurses, and others engaged in hospitals for the treatment of tuberculous disease, where all discharges are carefully disposed of, is not above the average in the general population.

c. By Swallowing.—Dust infected by the tubercle bacillus may be conveyed to food and so enter the alimentary canal ; or infection may occur more directly in the act of kissing, or by consumptive and healthy persons using the same food utensils. As about 10 per cent of the milk supplied to large cities contains tubercle bacilli from infected cows, this avenue of infection is particularly important in the case of children. The bovine tubercle bacillus is more commonly responsible for tuberculosis in young children than in adults, but the proportion of cases due to it varies very much in different localities.

d. There is no evidence that tuberculosis can be conveyed to

others either by the breath alone, or by emanations from patients, or by their garments, unless soiled by dried sputum or discharges.

5. The spread of tuberculosis is favoured by uncleanliness, overcrowding, and imperfect ventilation, and is hindered by the opposite conditions. Experience in hospitals and other institutions, where the following precautionary measures have been thoroughly carried out, indicates that by such measures the risk of infection is reduced to a minimum, namely : (*a*) The careful disposal and disinfection of the sputum and other discharges ; (*b*) The disinfection or destruction of soiled handkerchiefs, clothes, and linen ; (*c*) The removal of dust by frequent moist cleansing of the floors, walls, etc., of the rooms ; (*d*) The supply of abundant air-space and free ventilation with fresh air.

No risk is incurred by living in the immediate neighbourhood of institutions for the treatment of tuberculosis which are properly conducted.

LEGAL DECISIONS.

The following legal decisions, given during 1914, are important in their relation to State Medicine and Sanitary Administration :—

1. Adulteration of Food and Drugs.

Booth v. *Helliwell* (*King's Bench Division*).

Sale of Food and Drugs Act, 1875 (38 & 39 *Vict.*, c. 63), s. 6—*One man company—Sale by assistant—Sale to prejudice of the purchaser—Liability.*

Butter containing 90 parts per cent of margarine was sold to an inspector by an assistant employed at a shop belonging to a one-man limited liability company, and a summons was taken out against the man owning the company and not against the company, and a conviction followed. On appeal, it was *held* that the seller was an assistant and a servant of the limited liability company, and that, consequently, the company was liable, and not the one man who, as a fact, was the company, and the Magistrate's conviction must be quashed. *Appeal allowed and conviction quashed.*

Batchelor v. *Gee* (*King's Bench Division*).

Sale of Food and Drugs Act, 1875 (38 & 39 *Vict.*, c. 63), ss. 6, 8—*Sale to prejudice of purchaser—Defence of label.*

Cream was sold to an inspector, and was found to contain 0·214 per cent of a preparation or proportion of boric acid, i.e., 15 grains per lb. of crystallized boric acid. The cream was served in a labelled earthenware pot, into which the cream was poured from a labelled four-quart can, the label in each case being as follows : " Preserved cream containing boric acid not exceeding 0·5 per cent." The purchaser's attention was not drawn to the labels, which, as a fact, were not visible during the sale of the cream. A summons was taken out against the vendor, and the Magistrate convicted. On appeal, it was *held* that the vendor, in order to have a defence under Section 8 of the Sale of Food and Drugs Act, 1875, must bring to the mind of the purchaser the fact that a label of the kind described by the section is on the article. *Appeal dismissed.*

Marcus v. *Crook* (*King's Bench Division*).

Sale of Food and Drugs Act, 1875 (38 & 39 *Vict.*, c. 63), s. 25—*Sale of Food and Drugs Act*, 1899 (62 & 63 *Vict.*, c. 51), s. 20(1)(2)—*Defence of warranty—Time within which notice to warrantor is to be given.*

Under the warranty sections, a copy of a warranty must be sent to the purchaser of the article of food or drug " within seven days after service of the summons," with a written notice stating that the vendor intends to rely on such warranty, and the vendor must also send " a like notice of his intention " to the warrantor. The interpretation to be put upon these words varies, some maintaining that this second notice must be " within seven days after the service of the summons," and others, that the time in which such second notice

is served upon the warrantor must be reasonable. In the case of Marcus *v.* Crook the notice was not given to the warrantors until after the summons had been part heard and adjourned, and it was *held* by the Magistrate that such notice was not reasonable, and the vendor was consequently convicted, on the ground that the warranty clauses did not apply. The adulterated food was milk containing at least 5 per cent of added water. On appeal, it was *held* that the words " a like notice " do not mean " a notice within seven days of the service of the summons " or " a notice within a reasonable time," but that what the Justices have to consider is whether, before the time of hearing (original or adjourned), the defendant has *in fact* sent the notice to the warrantor. *Appeal allowed and case remitted.*

2. Bylaws.

Leonard v. *Hoare & Co. Limited and Another* (*King's Bench Division*).

Public Health Acts Amendment Act, 1907 (7 *Edw.* 7, c. 53), s. 23—*Re-erection of part—Deposit of plans of whole.*

Part of a building was pulled down for the purpose of re-erection, and a plan was sent in to the Sanitary Authority showing such proposed partial re-erection. The plan was refused, on the ground that the plan should show the whole building (both the proposed re-erected and the other), and a summons was heard before the Magistrates, at the instance of the Sanitary Authority. The Magistrates dismissed the information, being of opinion that the partial re-erection was the only building (new) intended to be erected, and that therefore the bylaw as to depositing a plan had been sufficiently complied with. An appeal was lodged against the Magistrates' decision, and the appeal was allowed and the case remitted, it being *held* that, in a district in which the Public Health Acts Amendment Act, 1907, s. 23, is in force, it is necessary for a person who pulls down part of a building and intends to re-erect that part, to deposit the plan of the *whole* building as it will be after the proposed erection, in order to comply with a bylaw requiring plans of buildings about to be erected. *Appeal allowed and case remitted.*

3. Children and School Children.

Oakey v. *Jackson* (*King's Bench Division*).

Children Act, 1908 (8 *Edw.* 7, c. 67), s. 12 (1)—*Refusal to allow operation as neglect—Reasonableness.*

A child suffered from adenoids, causing mental dullness, impaired breathing, deafness, and some anæmia, and necessitating an operation, which was refused by the parents (father and mother). A summons was taken out against the father for neglect to provide adequate medical aid, constituting neglect. The summons was dismissed by the Magistrates, on the ground that the refusal did not constitute neglect. On appeal, the Magistrates' decision was reversed, and the case remitted to them, the Appeal Court *holding* that a refusal by a parent to allow an operation on a child may be an offence under the Act, if the circumstances are such as to make the refusal unreasonable. *Appeal allowed and case remitted.*

Poole v. *Stokes* (*King's Bench Division*).

Children Act, 1908 (8 *Edw.* 7, c. 67), ss. 12 (1), 38 (2) —*Neglect by mother—Separation of parents—Liability of father.*

A mother (living apart by agreement from her husband) unlawfully and wilfully neglected her children in a manner likely to cause them unnecessary suffering or injury to health. A summons was taken out against the father by an officer of the National Society for the Prevention of Cruelty to Children, but the Magistrates dismissed the information, on the ground that the father had done all he could to see that the children were not neglected in a manner likely to cause them unnecessary suffering and injury to health, and had thereby carried out his legal responsibility. On appeal, it was *held* that, where a husband is separated from his wife by agreement, and where the wife neglects their children in the manner above described, he is criminally liable for such neglect, if he is aware of it, even though he has supplied her with enough money for the support of the children.

Appeal allowed and case remitted.

Pilkington v. *Ross* (*King's Bench Division*).

Children Act, 1908 (8 *Edw.* 7, c. 67), s. 120—*Licensed premises—Kitchen used as kitchen and as bar—Presence of children therein.*

The Magistrates convicted a licensed beer-seller for allowing a child (age two years) to be in the bar, viz., the kitchen of the beer-house, which was used partly for such a purpose at times. There were, in addition, a bar and bar parlour, a tap-room, and a club-room. On appeal, it was *held* that there was evidence to support the conviction.

Appeal dismissed.

Hope v. *Devaney.*

Liverpool Corporation Act, 1913 (3 & 4 *Geo.* 5, c. 81), s. 35—*Verminous child—Notice to cleanse—Service of notice on child.*

A notice to cleanse a verminous child was actually served upon the child herself. The summons that followed (the notice not having been complied with within the twenty-four hours mentioned in the Act) was heard before the Liverpool Stipendary Magistrate, who *held* that the notice had not been properly served, in that it had been served upon the child and not upon the child's parent, and the summons was, consequently, dismissed. On appeal, it was *held* that the Magistrate's decision was wrong, it being *held* that there was no objection to the service of the notice, owing to the fact that such service had been made by leaving it with the child herself for her parent.

Appeal allowed and case remitted.

4. Combined Drainage.

Kershaw v. *Paine* (*King's Bench Division*).

Metropolis Management Act, 1855 (18 & 19 *Vict.*, c. 120), s. 250—*Metropolis—Pipe taking drainage of one house and roof-water from adjoining houses—Sewer.*

In connection with a terrace of dwelling-houses in Hampstead Borough, the drainage of one house was found to be defective, and a summons was taken out against the owner to abate the nuisance from

the defective drain. It was found that the drainage received also the rain-water from parts of the roofs of the two adjoining houses, but the Borough Council failed to produce any record of a combined drainage having been allowed by such Council or their predecessors in connection with the house in question. An indenture between the freeholder and leaseholder was produced, showing, *inter alia*, a covenant to "finish the buildings fit for human habitation . . . . with proper and sufficient sewers, drains, etc.," and it was claimed that the owner was thereby estopped from claiming the combined drainage as a sewer. The Magistrate dismissed the summons, and his decision was upheld on appeal, it being *held* by the Divisional Court that the drainage, being combined (as described above), was a sewer and not a drain, on the authority of Silles *v.* Fulham Borough Council (*vide* 1903, 67 J.P. 273 and 1903, 1 K.B. 829).

Appeal dismissed.

5. Common Lodging-houses.

London County Council v. *Hankins* (*King's Bench Division*).

London County Council (*General Powers*) *Act*, 1902 (2 *Edw.* 7, c. 173), ss. 46, 51, 52—*Metropolitan common lodging-houses—No community of eating or of sleeping accommodation—Licensing.*

Four ordinary dwelling houses in Kensington were used for lodging persons in separate rooms (each occupier of room having a separate key thereto) at a charge of one shilling a night each room. There was no community of sleeping accommodation, nor did the inmates inhabit one common room for eating purposes. A summons was taken out by the licensing authority (the London County Council) against the owner for failing to apply for a licence, but the Magistrate refused to convict, on the ground that the four houses were not common lodging-houses, there being no continuity of eating or sleeping accommodation. On appeal, the Magistrate's decision was upheld.

Appeal dismissed.

6. Factories and Workshops.

London County Council v. *Leyson* (*King's Bench Division*).

Factory and Workshop Act, 1901 (1 *Edw.* 7, c. 22), ss. 14 (2), 149 (2), 153 (1), 156—*Public Health Act*, 1875 (38 & 39 *Vict.*, c. 55), s. 4—*Factory consisting of four houses—Means of escape from fire—Liability of owner of two of the houses as the owner of the factory.*

Four houses in Camberwell Borough were used as a factory, employing more than forty persons. Two of the four houses belonged to one owner, and the other two houses to a different owner. The first-mentioned owner was summoned as the general owner of the factory for the non-provision of means of escape from fire. The Magistrate refused to convict, on the ground that the owner of two only of the four houses constituting the factory was not liable as the owners taken collectively. On appeal, the Magistrate's decision was upheld.

Appeal dismissed.

Street v. *Williams* (*King's Bench Division*).

Trade Boards Act, 1909 (9 *Edw.* 7, c. 22), s. 15—'*Outworker*'—*Meaning of term.*

On appeal against a Magistrate's decision, it was *held* that the fact that a person, to whom work is given out, employs other workmen under him, does not prevent him from being an 'outworker' under the Trades Boards Act, 1909. *Appeal allowed and case remitted.*

7. Housing and Town Planning.

Rex v. *Local Government Board; ex parte Arlidge* (*Court of Appeal*).

Housing, Town Planning, etc., Act, 1909 (9 *Edw.* 7, c. 44), ss. 17, 39 (1)—*Housing of Working Classes* (*England*) *Rules, Jan.* 11*th*, 1910, *rr.* 1, 3, 4, 5, 8, 9. *Local Government Board Act*, 1871 (34 & 35 *Vict.*, c. 70), s. 5. *Refusal to determine a closing order made under the Housing and Town Planning Act: Appeal to the Local Government Board; right of appellant to be heard.*

The Hampstead Borough Council refused to determine an order (closing), made in connection with a house in that borough, and an appeal to the Local Government Board by the owner was dismissed, and the closing order confirmed. The owner, who meanwhile had carried out certain repairs to the house, applied to the Borough Council to determine the closing order, and, on their refusing to do so, again appealed to the Local Government Board, and this appeal was also dismissed. Application was made to the Divisional Court by the owner for a *rule nisi* to the Board to show cause why a writ of *certiorari* should not issue to quash an order dismissing this last appeal, the rule being moved on the ground that the Board had not determined the appeal in manner provided by law, viz., had not heard the owner before making their order. The rule was discharged, and against this decision of the Divisional Court an appeal was lodged and the decision was reversed, it being *held* that the appeal to the Board was to be in the nature of a *lis inter partes*, and that, although the Board was not bound, before determining the appeal, to hear the appellant personally, yet he is entitled; before the decision is given, to see and consider the reports which the Board has before it, and to be heard upon them in some form. *Appeal allowed.*

[N.B.—The House of Lords has since adjudicated upon the case, and has reversed the decision of the Appeal Court Judges.]

Morgan v. *Kenyon and Another* (*King's Bench Division*).

Bolton Corporation Act, 1901 (1 *Edw.* 7, c. 135), s. 36—*Closing Order—Use of premises as warehouses—Structural alterations carried out constituting the erection of a new building.*

Section 36 of the Bolton Corporation Act, 1901, makes the conversion of a dwelling-house into any other building (not intended for human habitation) the erecting of a new building. Two houses were closed as unfit for human habitation by order of the Bolton Corporation, on the representation of the Medical Officer of Health. The houses were emptied of the tenants and used afterwards as a warehouse. Structural alterations were then carried out, converting the two houses into one, and a summons was taken out by the Corporation

on the plea that, as this work was practically the erection of a new building, in that dwelling-houses were being converted for use as a warehouse, notice of erection should have been given under the by-laws. The Magistrates *held* that there was no offence, as the two premises were in use as warehouses before they were converted by structural alterations into one warehouse. On appeal, the Magistrates' decision was reversed, it being *held* that the premises were dwelling-houses at the time of their conversion by structural alterations into a warehouse, and that, therefore, such conversion constituted an erection of a new building, to which the bylaws applied.

Appeal allowed.

Hall v. *Manchester Corporation* (*Court of Appeal*).

Manchester Water-works and Improvement Act, 1867 (30 *Vict.*, c. 36), s. 41—*Houses* '*unfit for human habitation*' *owing to neighbouring properties—Closing Order.*

Certain houses were certified to the Manchester Corporation to be unfit for human habitation, and orders were made for closure, such orders to be affixed upon the houses. An injunction was applied for from the Vice-Chancellor of the Lancaster Palatine Court and granted, to restrain the Corporation from affixing such closing orders, on the ground that there was no power to make a closing order, unless it was shown that the building concerned was in itself 'unfit,' irrespective of its proximity to, or contact with, any other building. On appeal, this decision was reversed, it being *held* that the provisions of the Act were general and not to be cut down, and that consequently an order (closing) could be made upon a certificate that the building was, from any cause whatever, 'unfit for human habitation.'

Appeal allowed.

Ryall v. *Kidwell & Son* (*Court of Appeal*).

Housing, Town Planning, etc., Act, 1909 (9 *Edw.* 7, c. 44), ss. 14, 15—*Landlord and tenant—Injury to child of tenant through defective condition of premises—No right of action by child.*

A defective bedroom floor caused an accident from which the child of the tenant suffered an injury. An action for damage was brought against the owners of the premises under the contract entered into between such owners and the child's father under ss. 14 & 15 of the Housing, Town Planning, etc., Act, 1909, which import into the contract of letting an implied undertaking by the landlord to the tenant that the house should be in all respects reasonably fit for human habitation. The County Court Judge non-suited the plaintiff on the ground that she was a stranger to the contract and had no right of action against the landlords. The Divisional Court upheld this decision, and, on appeal to the Court of Appeal, the decision of the Divisional Court was upheld. *Appeal dismissed.*

8. Medical Practitioners.

Rex v. *Ryan* (*Court of Criminal Appeal*).

Registration of Births and Deaths Act, 1874 (37 & 38 *Vict.*, c. 88), s. 20 (2)—*Perjury Act*, 1911 (1 & 2 *Geo.* 5, c. 6), s. 4 (1) (b)—*Criminal law—Wilfully making false certificate.*

A registered medical practitioner signed seven false certificates of

death, which were false to his knowledge, and which were to be used as 'cover' certificates for an insurance company, to whom they were to be given and not to a person required by the Act of 1874 to give information concerning a death. A conviction followed on the ground that the medical practitioner made false statements, and that he knew that he was so doing at the time that he drew up the certicates, i.e., that he wilfully made false certificates under the Act, or what purported to be certificates, and which could be used as such. The prisoner appealed, but the appeal was dismissed, and the conviction upheld. *Appeal dismissed.*

Sprawson v. *Firth* (*County Court*).

Question of liability for fees of operating surgeon called in by general practitioner.

The County Court Judge *held* that an operating surgeon had no right to summon a patient for balance of operation fees in a case in which the ordinary medical man in attendance had received part payment for medical attendance (including operation).

Judgement for the Defendant.

9. National Insurance.

Newell v. *King and Another* (*King's Bench Division*).

National Insurance Act, 1911 (1 & 2 *Geo.* 5, c. 55), *First Schedule, Part I* (*a*)—*National Health Insurance* (*Intermediate Employers*) *Regulations* (*England*), 1913. *Non-liability of owner of works for employed contributors employed by workmen direct*—'*Tierers*' *employed in silk mills.*

'Tierers' assist block printers by 'burring' or arranging their colours for them in connection with Silk Mills. The 'tierers' are selected, engaged, and controlled by the workmen, whom such 'tierers' are to assist, and the wages are paid by the workmen engaging, but only the owners of the premises have the right to dismiss the 'tierers.' It was decided by the Magistrates that the 'tierers' were not persons 'employed' by the Owners, and were not 'under the general control and management' of such owners. On appeal, the Magistrates' decision was upheld. *Appeal dismissed.*

Bailey v. *The Insurance Section of the Co-operative Wholesale Society, Limited, and Another* (*King's Bench Division*).

National Insurance Act, 1911 (1 & 2 *Geo.* 5, c. 55), ss. 8, 14, 67—*Sickness benefit—Incapacity for work on account of some specific disease or by bodily or mental disablement—Medical certificate—County Court no jurisdiction.*

An 'insured' person entered an action in the County Court to enforce sickness benefit from an approved society, forwarding a medical certificate to the following effect: "Suffering from debility and unable to work," but refusing to furnish a further certificate stating the cause or causes of the debility. An injunction was granted, and an order made for the payment of outstanding sickness benefit, on the ground that the County Court had jurisdiction over

the approved society, which, in the opinion of the County Court, had acted *ultra vires* in refusing to pay sickness benefit on the medical certificate sent in. On appeal, it was *held* that the dispute was one to be determined by the domestic tribunal pursuant to s. 67 (1) of the National Insurance Act, 1911, and that the County Court had no jurisdiction to hear the action. *Appeal allowed.*

Nunnery Colliery Company v. *Stanley* (*King's Bench Division*).

National Insurance Act, 1911 (1 & 2 *Geo.* 5, c. 55), s. 101 (2)—*Unemployment—Presentation of unemployment book not a condition precedent.*

A fitter to an engineering firm was engaged and, as he did not present his insurance book to his employers, they did not pay the unemployment contributions. A summons was taken out, and the Magistrate convicted the firm on the ground that the presentation of an insurance book by a workman to an employer was not a condition precedent, but that the employer should obtain an emergency book. On appeal, this decision was upheld. *Appeal dismissed.*

10. Nuisances.

Wood v. *Conway Corporation* (*Court of Appeal*).

Nuisance from gasworks—Injury to trees, but no habitation injuriously affected—Injunction or damages.

An owner of property obtained in the Divisional Court an injunction (with damages) against the Conway Gas Works for causing damage to his trees by noxious fumes and vapours. An appeal was lodged on the ground that the plaintiff's house was not affected; but the appeal was dismissed, and the decision of the Divisional Court affirmed. *Appeal dismissed.*

11. Rag Flock.

Cooper v. *Swift* (*King's Bench Division*).

Rag Flock Act, 1911 (1 & 2 *Geo.* 5, c. 52), s. 1 (1)—*Meaning of the word 'rags.'*

A summons was taken out against a firm for unlawfully selling flock manufactured from rags which did not conform to the standard of cleanliness prescribed under the Act by the Local Government Board, viz., 176, 93, 54, 156, 110, and 167 parts respectively of soluble chlorine per 100,000 parts of flock, instead of 30 parts. The flock consisted of jute refuse, such refuse being composed partly of waste fluff from the machines and partly of cuttings from woven jute fabric cut away as waste in the process of manufacture, no part of the material having been otherwise used, and no part of it having been washed; and the Magistrate *held* that such flock was not flock manufactured from rags, and the summons was dismissed. On appeal, it was *held* that the Magistrate's decision was wrong, and the appeal was allowed and the case remitted to the Magistrate, it being also *held* that the flock, as defined above, is flock manufactured from 'rags' within the meaning of the Rag Flock Act, 1911.

Appeal allowed and case remitted.

12. Rivers Pollution.

West Riding of Yorkshire Rivers Board v. *Heckmondwike Urban District Council* (*King's Bench Division*).

Rivers Pollution Prevention Act, 1876 (39 & 40 *Vict.*, c. 75), ss. 10, 13 —*Order in County Court—No necessity for preliminary notice in writing before taking proceedings for penalties for default.*

A Summary Order was made under s. 10 of the Rivers Pollution Prevention Act, 1876, requiring a person to abstain from the commission of an offence under that Act. On default, an application for penalties was made, but an order was not issued, on the ground that there had been no two months' written notice given as required by s. 13. The Rivers Board appealed, and it was *held* that two months' written notice of the intention to take such proceedings need not be given to the offender. *Appeal allowed.*

West Riding of Yorkshire Rivers Board v. *Linthwaite Urban District Council* (*King's Bench Division*).

Rivers Pollution Prevention Act, 1876 (39 & 40 *Vict.*, c. 75) ss. 3, 4, 5, 6, 20—*Rivers Pollution Prevention Act*, 1893 (56 & 57 Vict., c. 31) s. 1—*Manufacturing and mining pollutions—Persons actionable.*

A County Court Judge convicted a Sanitary Authority (the Linthwaite Urban District Council) for committing an offence under Section 4 of the Rivers Pollution Prevention Act, 1876, by permitting to be carried into a stream polluting liquid, proceeding from certain factories or manufacturing processes carried on in such factories. On appeal, it was *held* that the local Sanitary Authority was not liable, as they could not be proceeded against under Section 4, but only under Section 3, of the Rivers Pollution Prevention Act, 1876.

Appeal allowed.

Rochford Rural District Council v. *Port of London Authority* (*King's Bench Division*).

Thames Conservancy Act, 1894 (57 & 58 *Vict.*, c. 187), s. 94—*Sewage—Discharge into Thames—Liability of Sanitary Authority.*

Crude sewage was found to be discharging into a tidal creek off the River Thames from two old brick sewers belonging to a Sanitary Authority, though not constructed by them. The Authority had provided no system of sewage disposal or sewerage for the district in which the two old brick sewers were situated, but they had constructed chambers in connection with these sewers for the prevention of solid matters being discharged into the creek. The Port of London Authority took out a summons against the Sanitary Authority, and a conviction followed. On appeal, it was *held* that, as the Sanitary Authority had exercised control over the sewage, as shown by the fact that they had constructed manholes, there was evidence that they had caused or suffered it to flow into the creek. *Appeal dismissed.*

13. Water Supply.

Metropolitan Water Board v. *Avery* (*House of Lords*).

Metropolitan Water Board (*Charges*) *Act*, 1907 (7 Edw. 7, c. 171), ss. 8, 25 — *Domestic purposes — Trade purposes — Public-house with catering business—Water used for preparation of luncheons.*

The County Court decided that a supply of water to a public-house for use in connection with the preparation of luncheons was for the purposes of a trade or business, and not for domestic use, and gave judgement for the plaintiffs (the Water Company). The Divisional Court reversed this decision, and, on appeal, the Appeal Court affirmed the decision of the Divisional Court. On further appeal to the House of Lords, it was *held* that the water was used for domestic purposes within the meaning of Section 25 of the Metropolitan Water Board (Charges) Act, 1907, and must be charged for on that footing (*vide* also Medical Annual, 1914, 685). *Appeal dismissed.*

Bristol Guardians v. *Bristol Waterworks Company* (*House of Lords*).

Waterworks Clauses Act, 1847 (10 & 11 *Vict*,. c. 17), ss. 1, 35, 53, 68 —*Bristol Waterworks Act*, 1862 (25 *Vict*., c. 30), ss. 4, 68, 73—*Workhouse—Water supply—Domestic purposes—Supply by measure or at a rental.*

The Bristol Water Works Company refused to supply water as a domestic supply at a rental in connection with the Bristol Guardians' Workhouses, and the Divisional Court upheld the action of the Company, on the ground that a workhouse was not a dwelling-house (private), in relation to which water supplies for domestic purposes were limited by s. 68 of the Bristol Water Works Act, 1862. This decision was affirmed by the Court of Appeal. A further appeal to the House of Lords affirmed the decision of the Court of Appeal, it being *held* that, upon the construction of s. 68 of the special Bristol Act, 1862, in conjunction with s. 53 of the Water-works Clauses Act, 1847, the right to demand a supply of water for domestic purposes was limited to private dwelling-houses. *Appeal dismissed.*

III. INDUSTRIAL DISEASES AND TOXICOLOGY.

Industrial Skin Diseases.

It is estimated that 4 per cent of skin cases are due to the occupations of those suffering. The irritants or direct causes of the skin diseases gain access through the hair follicles and the openings of the sweat ducts, more especially when the protective layer of grease, normally on the skin, has been removed by constant washing with soap and water by various chemicals that have the power of dissolving it.

A very important group of skin diseases consists of those directly set up by the occupations of the patients, and due to some form of external irritation, which may be—

1. Mechanical, e.g., abrasions and bruises, ulcers, callosities, etc.

2. Atmospheric—(*a*) abnormal temperatures, (*b*) abnormal humidity, (*c*) abnormal air pressure, (*d*) excessive light, or light containing too many actinic rays.

3. Parasitic (animal and vegetable).
4. Spirochætal, e.g. syphilis.
5. Bacterial, e.g., anthrax, glanders, tuberculosis, leprosy, etc., and other infectious diseases.
6. Chemical, e.g. aniline dyes, chrome, lead, arsenic, etc.

In addition to the above, certain skin diseases are incited, aggravated, or prolonged because of the influence of work upon the general health of the workers, and there are also the skin diseases accidentally acquired because the work requires a worker's residence in some particular climate or in some endemically infected district. The trade stigmata are not true diseases of the skin.

Early Diagnosis of Lead Poisoning.

The importance of early diagnosis of plumbism, the most frequent of occupational diseases, is now generally admitted. Until notified, precautions against the disease cannot be taken, nor can investigations be made. At present, too much emphasis is laid upon the presence of the lead-line or basophilic degeneration of the red cells. There are many other symptoms, which, however, are not well defined, e.g., anæmia, debility, constipation, lumbago or chronic arthritis, pallor of skin, pinched appearance of face, general muscular weakness with 'rheumatic' pains in the joints and muscles, gastro-intestinal symptoms other than constipation and colic, general nervousness, persistent headaches, and dull mentality—all symptoms which point to plumbism in lead-workers, and call for careful inquiry as to lead poisoning being the probable cause. Neither the lead-line on the gums nor the basophilic degeneration of the red cells is pathognomonic of the disease; indeed, neither may occur in a definite case of plumbism. They may be, however, important confirmatory signs, and must be treated as such; but too much importance must not be attached to them as has been the case in the past.

Silicosis and Tuberculosis.

Pulmonary tuberculosis cannot be legitimately classed with the industrial diseases. In South Africa, however, there appears to be an intimate inter-relationship between silicosis and tuberculosis. It has been noted that the incidence of pulmonary tuberculosis is specially high amongst those who follow dusty occupations. Tin-miners, copper-miners, scissors-grinders, and file-makers suffer most from so-called industrial phthisis, which is probably, in the large majority of cases, a pulmonary fibrosis due to pneumokoniosis, the tuberculosis infection being secondary. Is the pneumokoniotic or silicotic lung unusually liable to a tuberculosis infection? Experiments by D. Casa-Bianchi on animals seem to prove that such is really the case. In the human being, tuberculosis is found chiefly in the most densely fibrosed and airless parts of the lungs, pointing also to the suggestion that the tubercle bacillus gains access to the lung by way of the blood-stream, and not by direct inhalation into the air-passages. The bacilli are arrested, and permitted to proliferate in those parts of the lungs in which the blood and lymph circulations are most impeded. A free movement of lymph from capillaries to tissue spaces, from tissue spaces to lymph vessels, and from lymph

vessels to lymph nodes, ensure the non-lodgement of the *Bacillus tuberculosis* (or other germ), and, consequently, the non-infection of healthy lungs.

Granted this increased liability to attack in the case of pneumokoniotic or silicotic lungs, where do the germs of tuberculosis come from? The infection is undoubtedly personal from workman to workman, or from workman's family to workman. The source from workman to workman is an indirect one—from the expectoration that is deposited in mines in all sorts of places, e.g., walls, floors, timberings of workings, sides of cages, steps and handrails of ladderways, or the handles of hammers and the shafts of jumpers (through the well-known habit of the miner of spitting upon his hands), etc., and that gets transferred to the workpeople through food or in the form of dust.

Carbon-monoxide Poisoning.

This form of poisoning may be (1) Acute, or (2) Sub-acute or chronic. It is not a cumulative poison. The symptoms are: drowsiness, headache, nausea and vomiting, mottled skin and cyanosed lips and lobes of ears, unconsciousness, stertorous respirations, loss of control over sphincters, suffused conjunctivæ, contracted pupils (reacting to light), etc. Carbon monoxide enters the body by inspiration, and its effect is to displace the oxygen from the oxyhæmoglobin and from carbon monoxoglobin, thus destroying the oxygen and carbon-dioxide carrier functions of the red cells. Treatment consists in the application of local heat, fresh air, and cardiac stimulants.

Veronal Poisoning.

Several cases of veronal poisoning have been reported during 1914, and once more the fact has been emphasized that the therapeutical dose cannot be exceeded with safety, except in very special cases. Veronal is an exceedingly potent hypnotic—one of the quickest, safest, and most reliable, *if taken in strictly therapeutic doses, i.e., 5 to 10 gr.* The effect is cumulative, and certain persons are specially susceptible to its effects, which are increased in those suffering from renal disease or constipation.

The toxic symptoms are: drowsiness, headache, and sometimes ataxy, accompanied by a reeling gait, the patient falling into a deep sleep from which he or she can only be aroused with difficulty, or which passes into coma, with cyanosis and stertorous (rapid) breathing. All the physical signs of pneumonia may be present, and the temperature may rise to 103° F. or more; these signs pass into those of general œdema of the lungs, i.e., moist bubbling râles all over the chest.

To the above symptoms may be added gastric disturbances in the case of the veronal habit, and rashes over the skin, together with urinary disturbances, e.g., suppression, polyuria, albuminuria, hæmaturia, etc., and mental and moral abnormalities. A dose of 50 gr. would be dangerous, and may be regarded as the *minimum* average fatal dose, though recent cases have been recorded of recovery after 100 gr. or more. These are the exceptions, however, and, on the other hand, death has occurred after as small a dose as 15 gr. in a susceptible person.

The post-mortem appearances are in accordance with the symptoms described as occurring during life, e.g., cyanosis, lung congestion or pneumonia, with heart dilatation, i.e., the usual signs of gradual heart failure, complicated by œdema and hypostatic congestion of the lungs.

Treatment consists in washing out the stomach, if the veronal has been taken within a few (four) hours, and the administration of cardiac stimulants, e.g., strychnia and digitaline, together with normal saline and glucose injections, subcutaneously or per rectum. Coma may last several days, so that the patients may have to be fed artificially during that time.

Veronal is insoluble in water, but soluble in weak caustic soda and in alcohol, giving well-marked crystals. Veronal can be extracted from the viscera and urine of a patient. The viscera must be treated with alcohol, acidified with acetic acid. The melting point of pure veronal is 191° C.—an important point.

Quinine Poisoning.

Large doses of quinine (e.g., 20 to 30 gr. of sulphate of quinine) in a single dose may cause vomiting, pain in the stomach, giddiness, flushing of face, palpitation, headache, ringing in the ears and deafness, dilated pupils, and even delirium and coma. Several cases of accidental poisoning by quinine have been published during the year 1914, and the details show the above symptoms. Ammonium carbonate in water is suggested as an antidote to precipitate the unabsorbed quinine, and to act as an emetic and alternatively as a stimulant. The use of the stomach tube and the washing out of the stomach with a solution of bicarbonate of soda are also suggested.

IV. SCHOOL MEDICAL SERVICE.

Medical Inspection of School Children.

It was little anticipated by the drafters of the small Bill known as the Education (Administrative Provisions) Bill, 1907, that when an Act it would, by virtue of one section (No. 13), give rise to an *immensity* (that is the only word that meets the proper description of the case) of work in connection with the medical inspection of school children. By this small section, it is the duty of a local education authority to provide for the medical inspection of the children, whilst there is also added the power to make such arrangements as may be sanctioned by the Board of Education for attending to their health and physical condition. This power is increased by the Local Education Authorities (Medical Treatment) Act, 1909.

Under the Education (Administrative Provisions) Act, 1907, as amplified by the Memorandum on Medical Inspection of Children in Public Elementary Schools (Circular 576, paragraph 12), there are to be three compulsory medical examinations for each school child, viz.: (1) Immediately before, or at the time of, or as soon as possible after, admission to school; (2) At, or about, the third year of school life (say, the seventh year of age); and (3) At, or about, the sixth year of school life (say, the tenth year of age). A further inspection may also

be made, viz., immediately before the departure of the child into working life. The object of these medical inspections is the discovery of children presenting some deviation from the normal—physical, mental, etc.

The benefits to be obtained from medical inspection are twofold, viz., direct and indirect, and each class has its advocates. The latter—the indirect—may be summed up in the word 'educational,' affecting parents (especially mothers), teachers, educational authorities, etc. The former—the direct—affect the child itself, and make for its better physical condition. So far, so good. There are other children, however, besides those attending school—the absentees from school, and children below school age, who need catering for in respect of medical inspection and treatment. School medical inspection accomplishes only part of the work required, but it is an important part, and we must rest satisfied for the present, on the ground that half a loaf is better than no loaf at all. The rest will follow ; indeed, baby clinics, schools for mothers, child welfare schemes, etc., although comparatively new, are coming to the front and being discussed everywhere, as also the administrative difficulty as to which authority is is to be responsible for, and to dole out, the grants of the Imperial Exchequer, viz., the Local Government Board or the Board of Education. Administratively and economically, there should be one Board, and one Board only, for the purpose ; but whether the Local Government Board, the Board of Education, or an independent Board is a matter for the Government.

Ordinary school ailments and abnormalities are being brought to light daily by school medical inspection, and it is with such that the school medical service is mainly, if not entirely, concerned. For the discovery of incipient illnesses and diseases, a more serious inspection is required, and such illnesses and diseases will only be found amongst the absentees, mothers allowing their children to stay away from school in such circumstances. This point requires emphasis. Ordinary school ailments and abnormalities undoubtedly require attention so as to enable those affected to obtain the maximum benefits from the teachings to which they have compulsorily to submit, when such ailments and abnormalities have been attended to. This method, however, will not necessarily bring about that betterment of the race to which some optimists and Utopians look forward, but it is a step in the right direction, and is, as a fact, accomplishing a large amount of good. School medical officers' reports, as they are published, show this, and statistics are fast accumulating, proving that the Legislature was right when it passed the Education (Administrative Provisions) Act, 1907, and the Local Education Authorities (Medical Treatment) Act, 1909, though probably at the times of passing the Bills into Acts it was not anticipated that such an immensity of work would be quickly thrown upon the Educational Authorities.

School Clinics.

The natural result of medical inspection is medical treatment : without the latter the former is practically useless. The diseases and abnormalities met with in scholars as the result of inspection are many and various, requiring skilled medical and surgical advice. The initial difficulty is that, though parents are advised of the necessity

for medical treatment being obtained for their children, such advice is not always taken, for one reason or another. The consequence is that the children are not attended to. This difficulty has led to the institution and establishment of clinics, which are, primarily, for the treatment of school diseases, e.g., defective eyes, teeth, or ears, adenoids, ringworm, scabies, impetigo, and other skin diseases, etc. These are the diseases that appear to have been neglected, or inefficiently treated, or both, through the ordinary channels of private practitioners, infirmaries, special hospitals, dispensaries and Poor Law. It seems only reasonable that, where parents refuse or neglect to have their children treated, the State should step in and act *in loco parentis*. On the socialistic principle that every child born has a right to live, so every school child, who is compelled to be educated, should be put into the best condition of health to benefit by such education. In this way, and on this principle, school clinics have come to stop.

Children requiring treatment are excluded from school and transferred to the clinics, where they attend until cured. The diseases are carefully diagnosed and efficiently treated. The clinics are fed by the inspecting school medical officers, the school nurses, and the teachers. It is clear that urban districts are most suited for clinics: rural districts are not sufficiently large, though, in this connection, 'flying clinics' have been suggested—'caravan clinics,' as they may be called.

The one drawback to the clinic is the expense, which, however, must be considered in connection with, and in relation to, the good results effected. Money spent out of the rates (Imperial or local) to render children in a suitable condition to receive and benefit by the education that the State compels them to receive, is surely well spent. Apart from this, children properly and efficiently treated at school age will make stronger and healthier men and women, and so the State itself will be benefited and 'physical deterioration of the race' will become an obsolete expression.

THE EDITOR'S TABLE.

Samples and particulars for this section should be sent to The Editor, "Medical Annual" Offices, Stonebridge, Bristol, ***before November 15th.*** *It is much to the interest of manufacturers to observe this rule.*

NEW PHARMACEUTICAL PRODUCTS & DIETETIC ARTICLES.

We are always ready, when a sufficient quantity is sent to us *early in the year*, to arrange for them to be tested in hospital practice and reported upon; under other circumstances our knowledge is necessarily more limited; but frequently the simple information as to where a particular preparation can be obtained is all the practitioner requires.

NEW MEDICAL INSTRUMENTS AND APPLIANCES.

We give Inventors and Manufacturers the opportunity of bringing their work before our readers entirely free of cost to themselves, and subject only to the following simple conditions :—

(1) Each article sent for notice must have the novelty or improvement claimed for it clearly stated upon a *separate* sheet or sheets of paper. This should have attached to it a copy of any illustration (*which must be small*) for which insertion is desired, and also bear the name of the firm.

The attention of Firms who send a large number of articles for notice is particularly directed to the above condition, as each article has to be sorted into its proper department before it can be considered.

(2) Medical Inventors should merely describe the instrument or appliance, and avoid giving technique of operations.

The Editor is not able to accept reference to circulars, catalogues, or literature as a compliance with these conditions.

We are anxious to express no opinion except as a result of practical knowledge, and it is owing to this fact that a notice in the MEDICAL ANNUAL has come to be valued.

MEDICAL AND SURGICAL APPLIANCES.

Adenotome (La Forces).—This instrument (*Fig.* 97) is used at St. Thomas's Hospital for removing adenoids. It is made by the Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C., in three sizes fitting one handle. It is a highly efficient and convenient instrument, and is packed in a box with one spare blade for £3 10s.

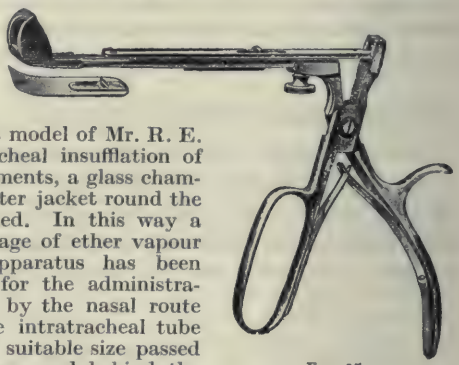


Fig. 97.

Anæsthesia, Apparatus for.—*For Ether.*—The illustration (*Fig.* 98) shows the latest model of Mr. R. E. Kelly's apparatus for intratracheal insufflation of ether. Among other improvements, a glass chamber for water, to serve as a water jacket round the ether reservoir, has been added. In this way a more even and stable percentage of ether vapour has been secured. This apparatus has been adopted by Mr. H. M. Page for the administration of warmed ether vapour by the nasal route in children. By replacing the intratracheal tube with india-rubber catheters of suitable size passed through the nares and pharynx and behind the tongue, warmed ether vapour is delivered over the glottis. One tube has been found sufficient in some cases, e.g., harelip. Although the positive pressure used in this method is not so important as with the intratracheal, in view of the fact that the respiratory movements are less than normal and that it must be possible to raise

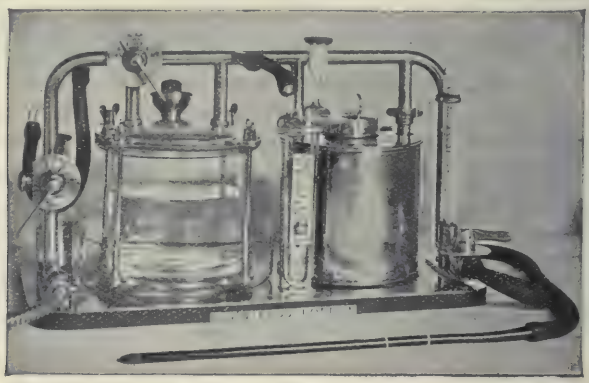


Fig. 98.

the intrathoracic pressure by closing the mouth, Mr. Page sets the safety valve of the apparatus to blow off at 15 mm. Hg.

This method of giving ether seems likely to be advantageous in operations on children where it is difficult or inadvisable to pass a tube through the glottis or increase the intrathoracic pressure, i.e., cases in which chloroform is often given instead. Made by Down Bros. Ltd., 21–23, St. Thomas's Street, S.E.

Ether Inhaler (*The Anson and Caldwell-Smith*).—Of the many methods of inducing anæsthesia, the 'open-ether method' is probably the most widely used and advocated. It has, however, two marked disadvantages: it demands the constant use of two hands, and it is probably the most wasteful and costly. The inhaler designed by Messrs. Anson and Caldwell-Smith (*Fig.* 99) is an ingenious effort to remove both these difficulties. To a Low's 'open-ether mask,' fitted with an ordinary (wide-bore) Clover facepiece, they have added a wide-bore expiratory valve. It will be noted that with any of the usual patterns of ether inhalers designed for the 'open-ether' method, both the inspirations and the expirations pass over the gauze. This is an obviously wasteful method, since only half of the ether vapour is serving any useful purpose; not only is the ether vaporized unnecessarily and that driven from the mask by the expiration a loss, but this unnecessary amount of evaporation causes a rapid and undesirable lowering of the temperature of ether in the gauze. There is also a deposit of moisture on its surface, which again is a deterrent to the proper amount of ether vapour reaching the patient. The addition of a simple wide-bore expiratory valve has overcome all these difficulties, and only the inhalations of the patient pass through the ether-charged gauze, the expirations passing out through the expiratory valve.

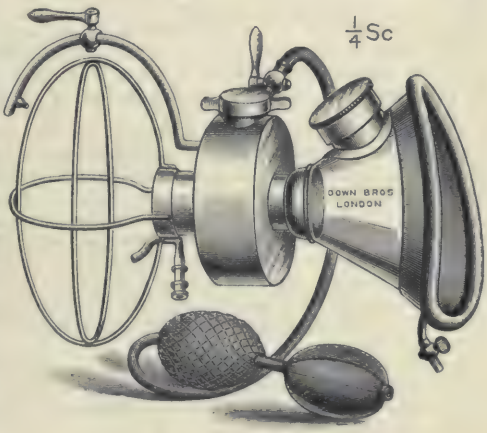


Fig. 99.

The second difficulty to be overcome was to make the apparatus a 'one-hand' apparatus and do away with the drop-bottle. This has been done by the addition of a hollow 'ether barrel,' which, in conjunction with a spray tube, answers the purpose of a drop-bottle. A slight positive pressure having been raised in the ether barrel by means of a small pair of bellows, which are supplied with the apparatus, the amount of ether dropped on the gauze is controlled by means of a small tap with a long handle; it can be easily regulated so that one drop falls on the gauze every few seconds, and the flow can be diminished or increased at will.

There are some other useful points to be noted with the inhaler; for instance, a small cap is provided to cover the expiratory valve on the facepiece; the anæsthesia can thus be commenced with A.C.E. or some other mixture, in which case the wire frame which carries the gauze can be used directly with the facepiece without the ether chamber. Down Bros. Ltd., 21 & 23, St. Thomas's Street, S.E.

Junker's Inhaler (*Modified*).—Mr. Dakin Mart has modified Junker's inhaler and introduced a special catheter for the intratracheal administration of chloroform. One improvement is that by turning three taps, air can be blown into the lungs instead of chloroform, whenever it is thought expedient. The extra opening in the catheter, as illustrated in *Fig.* 100, is an advantage, in that the throat around the catheter can be plugged with a sponge, the patient being still able to use the catheter alone for breathing air. In upper jaw operations, etc., where blood is liable to enter the larynx,

the fact of being able to place a sponge around the catheter in the throat is obviously a great advantage. A thin metal tube placed around the catheter prevents damage to it by the patient's teeth. This is made by the Medical Supply Association, 167–173, Gray's Inn Road, W.C.

Fig. 100.

Anæsthesia (Intratracheal).—Messrs. Mayer & Meltzer, 71, Great Portland Street, W., have made an improved form of Dr. Shipway's apparatus with a view to diminishing cost and weight. It is compact, light, portable, and easy to manpulate, and has been proved to be efficient. It can be used either with a foot pump or with an electric motor and pump. The former is provided with an air filter, which serves the double purpose of freeing the air from dust, etc., and of converting the intermittent air-stream into a constant one. The foot pump does not give such a regular anæsthesia as a mechanical device such as a motor, and entails rather hard work upon the anæsthetist during a long operation, but it is a very fair substitute. Where the motor is used, a foot pump should always be at hand in the rare event of a failure of the electric current.

An Invisible Dressing for Wounds.—By the discovery of "Boric Skin" we are now able to supply an antiseptic and absorbent dressing to wounds which is practically INVISIBLE. Boric skin has the appearance of a very thin transparent silk, very tough and flexible. It has no adhesive surface, either side of it can be applied to the moistened skin and it adheres so firmly that the part can be freely washed with soap and water if care is exercised in drying. It differs entirely from any plaister in the fact that it is absorbent. It neither collects dirt nor leaves a mark on the skin when removed. As it is a dressing and not a plaister, and becomes partly absorbed, it should be either renewed night and morning, or covered with another piece of boric skin if preferred.

We think this invention the most important advance in minor surgery of recent years, as the difficulty of treating wounds of the face and hands in a preventable way is universally recognized. The Brytstele Co., 106, High Street, Camden Town, London, N.W.

Arm Sling.—This is made of black sateen, with pocket, swivel buckle, etc. (*Figs.* 101 *and* 102). It is most firm and comfortable in use, and quite the most efficient 'sling' we have seen. It is reversible, and can be used for either arm. Made by the Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C.

Fig. 101.

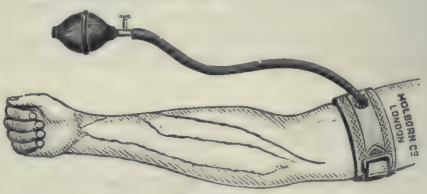


Fig. 103.

Fig. 102.

Armlet.—Captain Harrison, R.A.M.C., has designed a pneumatic armlet (*Fig.* 103) for use when administering salvarsan. This arrangement has the

distinct advantage that it can be deflated without moving the patient's arm, and the risk of piercing the wall of the vein from the jerk in loosening a rubber tourniquet is avoided. We find it very efficient. Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C.

Bougie for Hot Water.—The hot-water treatment for gonorrhœa is used at the Military Hospital. A single apparatus for this treatment consists of an enamelled-iron reservoir, rubber tubing, with a thermometer intercepted and a double-channelled bougie (*Fig.* 104) Water as hot as the patient can bear is circulated through the bougie, and by this means great heat applied to the urethra. The structure of the bougie used is shown in the larger illustration (*Fig.* 105). Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C.

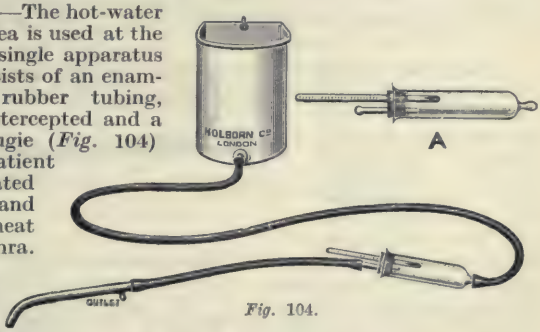


Fig. 104.

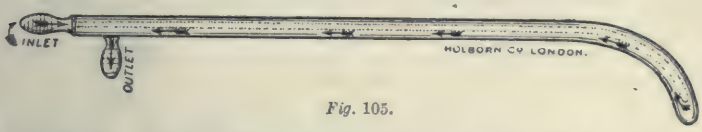


Fig. 105.

Whip Bougies.—Messrs. Allen & Hanburys Ltd. produce a special set of whip bougies with screw-on ferrets (*Fig.* 106) for treatment of difficult stric-

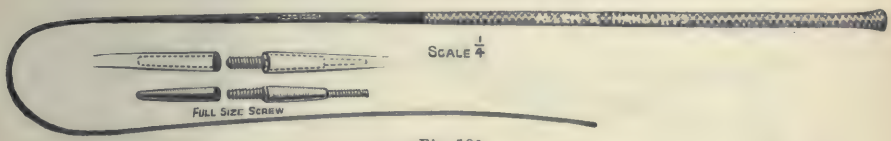


Fig. 106.

ture, as used by Mr. Canny Ryall. The screw attachment of the ferrets is very secure. The instrument is constructed of elastic gum, the ferrets being stiffened with an interior of special wire or gut.

Bowel Protection Plate.—This plate is designed to protect the bowel while suturing the abdominal wall. Its convenience for this purpose will be well

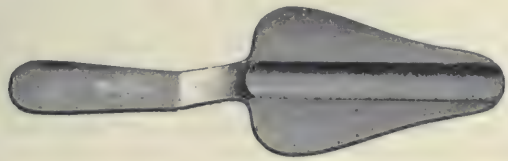


Fig. 107.

understood from the illustration (*Fig.* 107). It is made by the Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C., and costs 3/6.

Bronch-Œsophagoscope.—A modified form of Bruning's bronch-œsophagoscope has been designed by Sir William Milligan, of Manchester. This instrument is so constructed that the extension tube can be extended by means of a screw adjustment. It can be used in conjunction with Bruning's electroscope, or by indirect illumination as shown in the sketch (*Fig.* 108). Allen & Hanburys Ltd., 48, Wigmore Street, W.

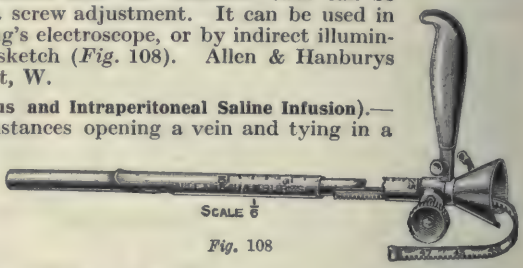


Fig. 108

Cannula (for Intravenous and Intraperitoneal Saline Infusion).—As under certain circumstances opening a vein and tying in a cannula is to be avoided when giving saline infusions, Sir Leonard Rogers, K.C.I.E., I.M.S., M.D., has had this instrument (*Fig.* 109) made by Messrs. Down Bros. Ltd., 21 & 23, St. Thomas's Street, S.E. The instrument consists of a sharp outer sheath pointed like an exploring needle, and enclosing a blunt cannula. By means of the sharp outer sheath the vein can be simply punctured through the skin, and the sheath can then be retracted sufficiently to expose the blunt cannula, and by means of a bayonet joint fixed back securely out of the way, leaving the inner blunt-ended cannula within the vessel, thus allowing large amounts of saline being safely given,

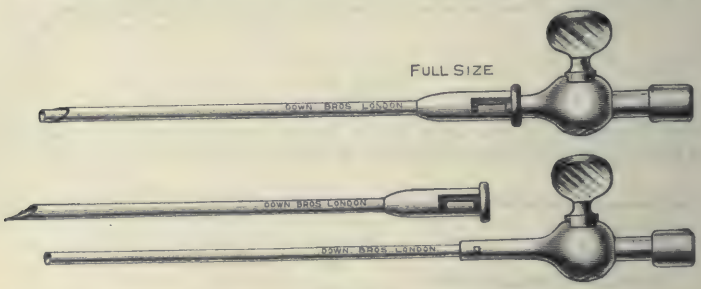


Fig. 109.

the outer cannula can also be removed for cleaning purposes, and a stilette is provided. The calibre of the inner tube is such that four ounces per minute can be delivered from an elevation of three feet, which is all that is required.

The instrument has a stop-cock similar to the inventor's former model of cannula, but is made straight, so as to be equally suitable for intravenous, intraperitoneal, and subcutaneous injections, as in the event of failure to puncture the vein, either the second or third method can be resorted to, if the operator does not feel disposed to open the vessel and tie it in. The instrument is connected up with a sterile flask of saline by tubing, with a short piece of glass inserted close to the needle, and all air expelled. The skin is sterilized with iodine, and the cannula is thrust obliquely through the skin, which is drawn fairly tight over the vein to fix it. In case of doubt the flask of saline is lowered to the level of the arm and the stop-cock turned on, when blood will be seen to enter the glass if the needle is in the vein, and the flask can be again elevated and the flow of saline established.

Catheter (Instillation).—This is made of silver, for use in the treatment of chronic posterior urethritis. The instrument is more easily introduced than Ultzmann's pattern, and the nozzle is made to fit the standard pattern

'Record' syringe. The nozzle is also grooved, so that it may be attached to a sterilizable urethral ball syringe of 1 dr. capacity, as shown in *Fig.* 110.

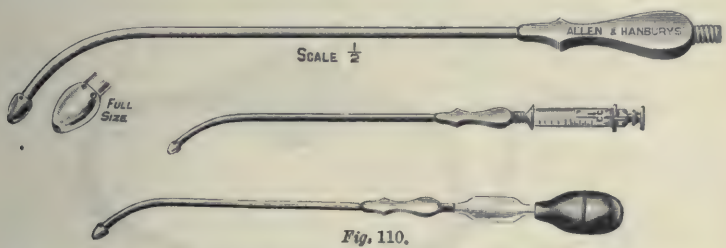


Fig. 110.

It is designed by Mr. Canny Ryall, and made by Messrs. Allen & Hanburys Ltd., 48, Wigmore Street, W.

Clamp and Cannula for Intestinal Obstruction. — The special clamp and cannula (*Fig.* 111) devised by Mr. R. D. Mothersole, facilitates emptying distended bowel in cases of intestinal obstruction. The cannula has a bore equal to that of a No. 12 catheter, and has a wire loop across one end which serves as a probe when it is introduced into the bowel, and afterwards prevents the bowel wall from blocking that end of the tube. Before use, a piece of rubber tubing is attached to the other end of the cannula, and the blades of the clamp (each of which has a gap in the centre) are sheathed with rubber tubing. The instruments are used as follows: The loop of bowel which it is proposed to puncture is raised between the left thumb and forefinger, and its apex, which should contain little but gas, is grasped with a stomach-clamp, so as to isolate about six inches of bowel. This is incised at the part of its circumference furthest from the mesentery, by a stab with a knife having a blade of the proper width. If the wound is too small for the cannula, it may be enlarged when withdrawing the knife. The cannula is now introduced by first inserting the loop into the wound, and then rotating it through a quarter circle so as to dilate the opening and enable the end of the cannula to be pushed on into the bowel. The clamp is then applied with its convexity towards the mesentery so as to grasp the cannula through the wall of the bowel, and also the edge of the latter, thus preventing any leakage. A gauze swab is now wrapped round the junction of clamp and cannula, the stomach-clamp is removed, and the bowel contents are allowed to drain into a vessel well away from the field of operation. This drainage can go on while the obstruction is sought for and relieved. The instrument is made by Messrs. Mayer & Meltzer, of Great Portland Street, W., and costs 21/–.

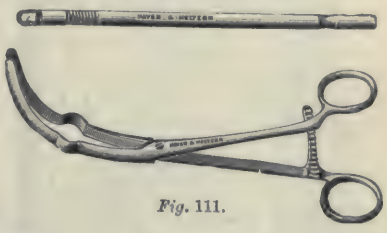


Fig. 111.

Ear Syringe (The 'Emandem').—This syringe (*Fig.* 112), designed by Dr. Ferguson, is provided with a nozzle shaped like an ear speculum, in which is fitted the efferent tube so shaped as to cause a flat stream of water to pass along the meatus and over the tympanic membrane. Considerable force may be used, without danger, to dislodge foreign matter, as the outflow from the speculum is considerably greater than the ingoing stream. The operator has the meatus under inspection while syringing, and thus can manœuvre to remove any foreign body.

We have been looking for an improved ear syringe for some time, and we think Dr. Ferguson's ingenious invention will meet the requirements of the

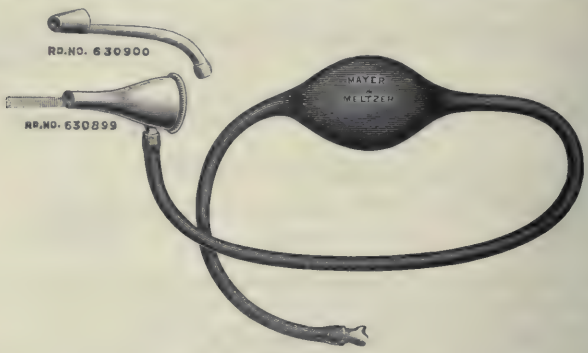


Fig. 112.

profession in a very satisfactory way. We are glad to have had it brought to our notice. Messrs. Mayer & Meltzer, 71, Great Portland Street, W.

Electrical Apparatus.—

The 'Kompact' X-Ray Outfit.—The Medical Supply Association, 167–173, Gray's Inn Road, W.C., have designed an *x*-ray apparatus (*Fig.* 113) with

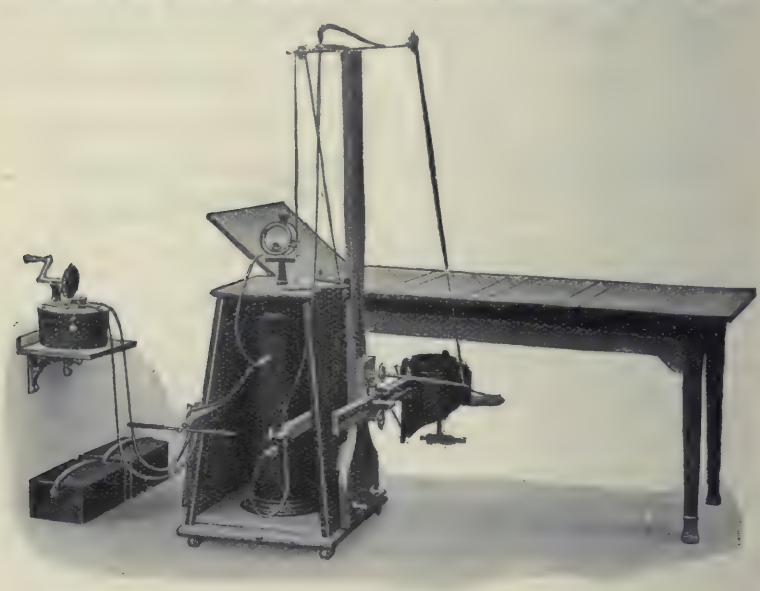


Fig. 113.

special view to its compactness and portability. One of its principal features is that the powerful induction coil itself forms the weight or base of the

x-ray tube stand; as a result *one* stand acts for *two* purposes. Secondly, when it is necessary to move the *x*-ray tube stand the coil moves with it, being on the same stand; therefore the conducting wires are always long enough to reach the *x*-ray tube and are always free, so that they do not touch the patient, or the bedstead or couch on which he may be reclining. Another feature is that it can be supplied with a hand motor or driving wheel, which causes a great saving of current when working from accumulators. It has many other good points which are fully explained in a pamphlet issued by the firm. It is a most simple and practical apparatus, and has given great satisfaction.

The 'Rystos' Portable X-Ray Outfit illustrated (*Fig.* 114) comprises a marble switchboard with main resistance, ampèremeter to measure the primary current, crank arm regulating switch, with multiple studs for the adjustment of current, main switch, light switch, motor switch with sliding resistance to control speed of interrupter suspended in cupboard at base, plug switch and fuses at side, complete to connect apparatus to direct current main, valve tube to suppress reverse current, and milliampèremeter to measure current passing through *x*-ray tube. The apparatus works from a motor-generator actuated by the alternating current, a micro-farad condenser being used in circuit. This is manufactured by Messrs. Reynolds & Branson, of Leeds, and has given every satisfaction, as it is both compact and portable and well designed in every detail.

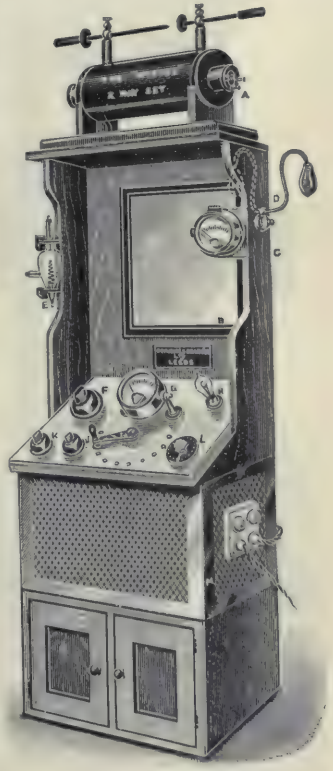


Fig. 114.

Screen Compressor (*for Detection of Calculi*).—This compressor is an improvement on that designed by Mr. E. W. H. Shenton, which was described by him in the *Lancet*. The apparatus is held in place by hand, and can be used both for radiography or screening. A flat metal base with a pair of handles on the back forms a protection for the hands and face of the operator. In the centre of this plate is a small trap door, hinged so as to open upwards, carrying a fluorescent screen protected with lead glass. At the back of the plate are fixed wooden guides into which may be slipped a casette, taking a 6½ in. by 8½ in. plate, thus enabling the apparatus to be used on an ordinary plate-holder. For this purpose the base casette in position but empty, is placed on the patient in the proper position, which can be ascertained by means of the fluorescent screen, when a plate may be slipped in place, without moving the apparatus, and an exposure made. The operator is able to keep his eye on the shadow of the object shown on the fluorescent screen while the photograph is being taken, and can thus detect and allow for any change in the tube. In use as a compressor proper, the casette is replaced by a slide carrying a metal tube 3½ in. in diameter and 6 in. long, the bottom being finished with a round bead of fibre which may be pressed against the bare skin of the patient without discomfort or danger of shock.

Fitting easily into the tube is a circular frame containing a fluorescent screen. The frame being in position at the bottom of the compressor tube, and the tube in place on the metal base, it is pressed firmly into the patient at the desired spot. The operator then obtains an extremely bright view of the small area. He is able to explore renal and bladder regions, also to examine more closely supposed kinks and other intestinal conditions after the administration of bismuth. Any discovery he may make can be recorded by instantaneous exposure on a small plate, which can be introduced into the compressor.

In order to introduce this plate, the screen-carrier is removed and a special plate-carrier is inserted in its place. The plate-holder consists of a circular light-tight box, provided with an intensifying screen. Special plates and four of the plate-holders are supplied with the apparatus. Before use the operator charges the plate-holders in the dark room, placing film of plate to intensifying screen in the usual way; he can then insert the plate-carriers into the compressor as needed.

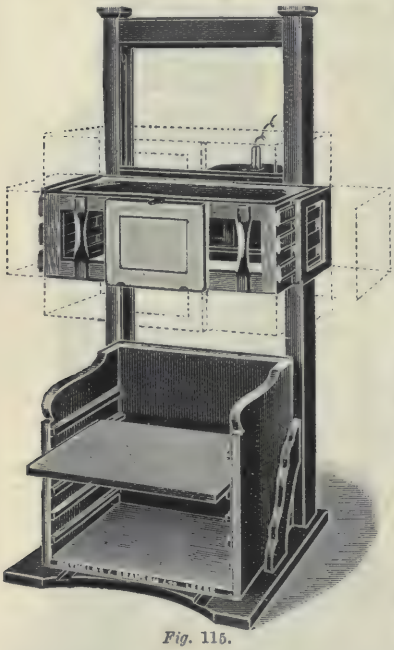


Fig. 115.

The extraordinary difference between photographs of renal calculi taken in the ordinary method and by this apparatus makes the instrument practically a necessity to all doing this class of work. Messrs. Harry W. Cox & Co. Ltd., 159, Great Portland Street, W., are the patentees and sole makers.

The '*Rystos*' *Vertical Screening Stand* (*Fig.* 115) is almost entirely made of wood, and is simple in design, as the illustration shows. The vertical posts carry a sliding frame which has vertical movements between the uprights. This sliding frame carries another frame which has transverse horizontal movements. Behind the smaller frame is attached the tube-holder and *x*-ray-proof box. In front of the frame is a support to carry the fluorescent screen or a plate-holder, so fixed as to move in register and simultaneously with the tube, the patient standing or sitting in position on an adjustable platform or seat between the tube and screen. The operator can quickly and easily examine the patient by moving the frame to the desired position with handles on the front of the apparatus. Both screen and tube-holder have simple means of adjustment to vary the working distance between the tube and screen. The front support of screen is made to slide to and from the patient during examination, and if further adjustment of distance is needed, the tube-holder can be moved by a simple clamp from the back. The seat or platform for patient also slides to and from the tube to vary the working distance, and can be quickly varied in height to give six positions to suit different positions. The whole of the moving parts are balanced with weights suspended in weight boxes with cords over pulleys, and move freely in any direction. This very practical arrangement is made by Messrs. Reynolds & Branson, of Leeds.

The Cox Screen Localizer which is here illustrated (*Fig.* 116) marks a new departure in apparatus for the localization of foreign bodies. Hitherto it has been necessary to employ somewhat bulky apparatus, and subsequent

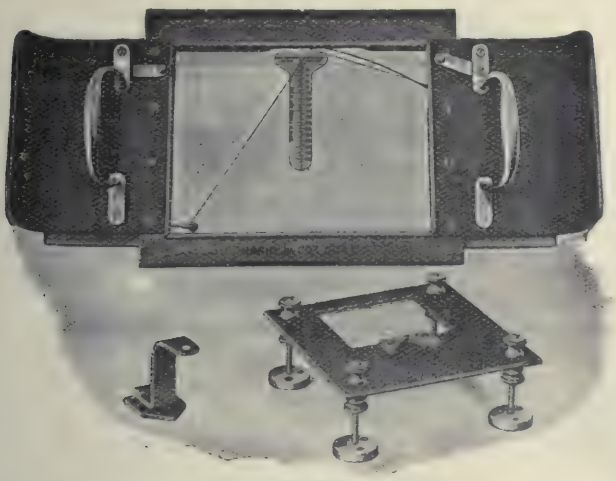


Fig. 116.

to the various manipulations a certain amount of calculation was required in order to arrive at the desired result. These disadvantages have now been entirely overcome. By means of the Cox screen localizer, foreign bodies are located with certainty, their positions being simply read off on a scale. Two motions only are required, and the result is obtained in a few seconds. The exact tube-shift does not matter, and the distance between tube and screen is automatically registered on the latter and so need not be measured, neither does it require to be any exact or known distance. Messrs. H. W. Cox & Co. Ltd., 159–161, Great Portland Street, W.

Fig. 117.

Cautery Accumulator.—This is of 2 cell 50 ampère-hours capacity, in celluloid cases, non-spillable type; the front is hinged as shown, giving easy access to the cells, either of which can be removed; two brass springs are fitted to the door which, when closed, make contact with the cells; a circular wire rheostat fitted on the front allows complete control over the current. The price of the instrument complete as illustrated (*Fig.* 117) is £3 10s. Messrs. Reynolds & Branson, of Leeds.

The Coolidge X-Ray Tube (*Fig.* 118) has been put into practical use during the present year, and the experience of those who have employed it in their practice has proved conclusively that it is a great advance on all previous types of *x*-ray tubes. The principle is quite new, and consists of heating from an independent source a flat tungsten spiral filament from which electrons are despatched by a high-tension current against a heavy tungsten anode. The tube is evacuated to such a high degree that no spark at all will pass, even when such high voltages as 150,000 volts are applied, until the cathode spiral is heated. The rays are completely under the control of the operator, as intensity may be varied by alternating the temperature of the spiral, while the penetration is dependent on the secondary E.M.F. of the induction coil or transformer. With apparatus of suitable design the current may be varied up to 200 milliampères and the penetration regulated as required. Messrs. Harry W. Cox & Co. Ltd. have already supplied about thirty of these tubes, and state that remarkable results are being obtained.

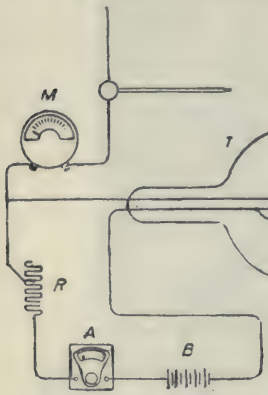
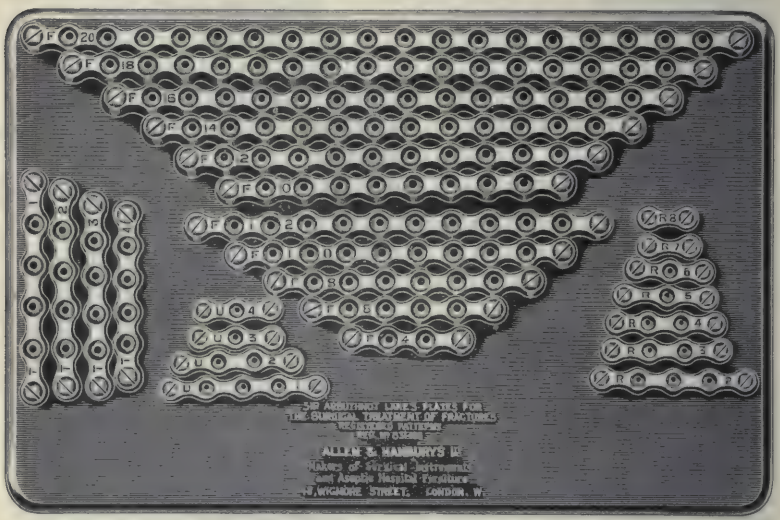


Fig. 118.

Fracture Plates.—*Fig.* 119 illustrates a new series of malleable steel plates for the operative treatment of fractures, as made by Allen & Hanburys for


SIR ARBUTHNOT LANE'S PLATES FOR
THE SURGICAL TREATMENT OF FRACTURES
ALLEN & HANBURYS
Makers of Surgical Instruments
and Aseptic Hospital Furniture
LOWNDES STREET, LONDON, W.
Fig. 119.

Sir W. Arbuthnot Lane. The chief advantage of the new model is that the screws can be inserted at any desired position by means of the frequent openings along the plates.

Goitre Retractor.—We illustrate here (*Fig.* 120) Professor Kocher's goitre retractor, as used by Mr. James Berry, of London. It is made by Messrs. Allen & Hanburys Ltd., 48, Wigmore Street, W.

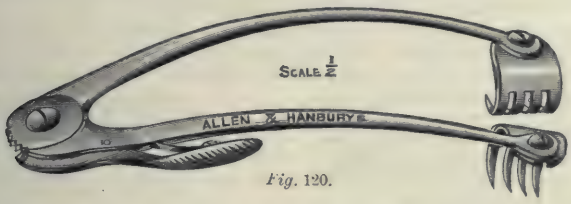


Fig. 120.

Hæmocytometer Pipette (Suction Ball for).—The ordinary suction mouthpiece used for the 1–100 pipette is very irksome in use, not being nearly so convenient as the bulb (*Fig.* 121) first used by Dr. O. C. Gruner for this purpose, by means of which suction can be readily checked at any point desired. It is convenient to use Toison as diluting fluid, and to take 0·5 cmm. blood, using the 'red-cell' pipette. This enables both red and white cells to be counted with the same pipette. After drawing up the blood to 0·5 in the ordinary way, draw up enough Toison to bring the blood into the mixing-chamber. Now apply the suction bulb, and holding the pipette in the fluid, squeeze the bulb, and then press on the lateral aperture with the finger pulp. Relax the bulb, and the viscid fluid will be drawn up the pipette, and by removing the finger from the aperture mentioned as soon as the upper mark is reached, the little operation will have been performed with exactness, and with a minimum of trouble on the part of the operator. Price 2/6. This is a very practical invention, and well carried out by Messrs. Reynolds & Branson, of Leeds.

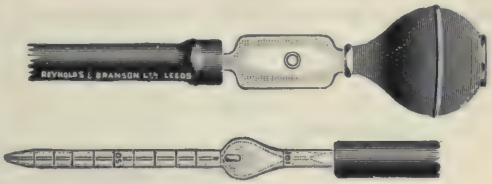


Fig. 121.

Hot-Air Radiators.—Under this name, Messrs. J. Thwaites & Co., 38, Colville Terrace, W., have introduced a series of heaters for warming beds, muffs, or for any purpose where heat is needed. It consists essentially of a piece of metal which, being heated over a gas-ring or coal fire, is placed in a convenient receptacle with screw-on cover, and then gives off heat during the process of cooling. To prevent any possibility of burning the skin, flannel bags are also supplied to enclose the radiators. As the metal takes some hours to cool, the radiator gives off a pleasant dry heat for some considerable time. It has an advantage over the hot-water bottle, as it cannot leak and is much more durable. Where ready means of heating the metal are procurable, these radiators are likely to prove very useful and practical.

'Hyposol' Vacuum Extractor (for taking sterile samples of blood).—The apparatus consists of an exhausted and sealed glass phial, attached by means of a piece of pressure tubing to a hypodermic needle. The neck of the phial and the needle are protected by a glass cap, and the whole apparatus is sterile for use. The skin over the vein selected for puncture is sterilized, and the vein distended by applying pressure in the usual way. The protecting cap is removed, the wire withdrawn from the needle with sterile forceps, and the needle inserted into the vein, pointing along its course. The needle is moved slightly in and out to ascertain that the point is free in the lumen of the vein, and the neck of the phial is broken near the point, between

the finger and thumb. The blood then flows slowly into the phial. When it has ceased to flow, the needle is withdrawn, the ligature which attached the rubber tubing to the phial is cut, the tubing removed, and the open end of the phial sealed in a hot flame. The bulb of the phial has a total capacity of 25 c.c., and is made to fit the Martin centrifuge.

As usually supplied, the phial contains 1 c.c. of a 10 per cent solution of sodium citrate. The citrate solution may be omitted if it is not desired to prevent coagulation, or the phial may be made to contain a few glass beads for purposes of defibrination.

The apparatus may also be obtained in a modified form, in which the blood is drawn directly into nutrient bouillon, or citrated normal saline. In this form the phial has a total capacity of about 65 c.c., and contains 50 c.c. saline or bouillon. In both forms of the apparatus the degree of vacuum is such that 10 c.c. of blood are drawn. The second form is preferable for bacteriological examinations, on account of the possible bactericidal effect of undiluted blood. The price of the ordinary 'Hyposol' Extractor is 1/3 net. The special forms are prepared to order only. (Allen & Hanburys Ltd.).

Hysterolabe (Dartique's). — This is designed for holding the uterus without injury during operations for prolapse, etc. The blades, being open and springy, minimize the risk of injury to the uterus (*Fig.* 122). The Holborn Surgical Instrument Co., 26, Thavies Inn, E.C.

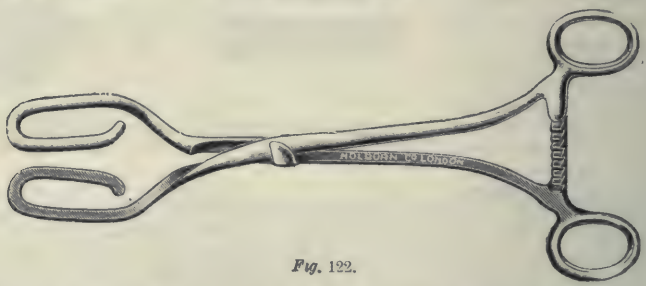


Fig. 122.

Ligatures. — Under the name of 'Azoule,' Messrs. Allen & Hanburys Ltd. have introduced a series of tubes of specially sterilized catgut, silk, etc., which are not only rendered aseptic, but are bacteriologically examined before being issued. They are put up in glass tubes, which are easily broken when required for use.

We have examined samples of the following: plain sterile catgut, iodized catgut, tanned iodized catgut, chromic catgut, silkworm catgut, silk (braided and twisted), horsehair, kangaroo tendons, sterile blood-vessel suture. The last contains a fine needle threaded with fine black silk, wound on a special winder. We regard this method of securing reliable sutures as a distinct gain to surgical work.

Medicine Case (The 'Attaché' Pocket) is a solid wood, hingeless case containing tablets for use by the soldier in the field. It is a very simple and serviceable contrivance, containing tablets of quinine sulphate, ammoniated quinine, permanganate of potassium, caffein and phenacetin, dyspepsia tablets (composition not stated), Easton's syrup, and cascara sagrada. We believe this case has a wide popularity before it. Its weight is 4½ oz., and it measures 5½ in. by 2¾ in. by ¾ in. (Mr. Frank A. Rogers, 327, Oxford Street, W.).

Microscope (The 'Davon' Super-).—We described in our last issue the micro-telescope invented by Messrs. F. Davidson & Co., 29, Great Portland Street, W. This was designed to provide the microscope with telescopic

powers combined with stereoscopic effect at all distances from the stage of the microscope to infinity. By what one may call the micro-telescopic principle, an image of a distant object is brought to a focus upon the plane of the microscope stage. This image is then magnified by the objective and eyepiece of the microscope acting in combination as the eyepiece of the telescope.

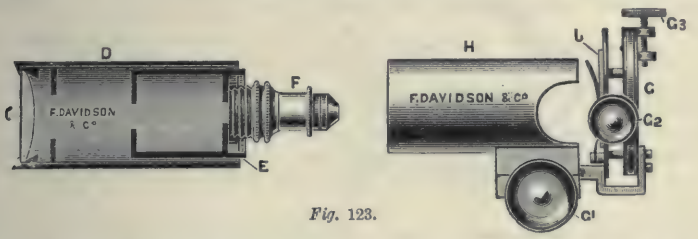


Fig. 123.

Mr. F. Davidson next conceived the idea of projecting an image of a near or microscopic object on to the stage of the microscope, this 'air' image to be magnified by the microscope. The result is surprisingly good in certain directions.

The invention, which has for its object the provision of the mechanism by means of which anyone possessing a microscope may have at his command practically unlimited magnifying power, is shown in the accompanying illustration (*Fig.* 123). The fitting 'D' is a tube carrying at one end a finely wrought positive eyepiece 'C,' and at the other a microscope objective. The interior of the tube is 'stopped.' This fitting is inserted into the Abbe rim of the microscope, the eyepiece coming directly under the stage. The fitting 'H' slides over the fitting 'D,' and has at its extremity a mechanical stage actuated by rack and pinion at G1, G2, G3. The slide to be examined is inserted at 'L.' Focussing is done first by the rack and pinion G1, second by the coarse adjustment, and finally by the fine adjustment of the microscope. The combined fitting D and H is called by the makers the 'primary' microscope, while the original is called the 'secondary,' and the combination results in the 'super-microscope.'

The old question of the antagonism between 'resolution' and high power is not helped, but for objects requiring great 'depth of focus' the effect is particularly remarkable. By the ordinary high power optical system a big N.A. is used only, and 'out of focus' is reached rapidly. By the super-microscope the 'air' image is magnified by another system which can only magnify what is there, and depth of focus *is* there if the aperature of the objective in the primary microscope be small.

For determining *relationship of structures* (easily resolved) to each other it is most useful, as the eye, seeing varying planes in focus at one time, gets a mental impression of relationship, while individual fine portions can be examined for ultimate detail in the usual way of a big N.A., and nothing but the part considered in focus.

It is recognized that with the existing microscopes the difficulty of 'finding the object' is a bar to the use of any higher power than can be furnished by a $\frac{1}{12}$th. With the super-microscope, *no matter what power be employed*, it is no more difficult to use it than it is to use alone whatever objective may be inserted in the 'primary.' For example, if one desired to use the power of $\frac{1}{300}$th, it would be as easy to do so as to use the $\frac{1}{12}$th in the ordinary way.

It is impossible to say what may ultimately be the result of having this tremendous power at one's command. The possibilities are certainly great. For photographic purposes we think very highly of it. We have before us specimens of photo-micrography in which, while a critically expert eye

might detect some defects, the results must be classed as distinctly good. Some specimens of fly's-eye photography are remarkable. Here it may be remarked that high-class photo-micrography is only possible to the expert, who doubtless has at his disposal the very finest, most elaborate and costly apparatus devised by the optician, and who has made perchance a life study of the work. The super-microscope places within easy reach of the amateur a simple and comparatively inexpensive way of doing remarkably good work.

The eyepiece of the microscope is never used, but a camera takes the place of the tube, no long-extension camera being necessary.

We have personally examined this invention, and we are particularly impressed with the fact that it gives us the power not merely of indefinite enlargement, but of obtaining a depth of view quite impossible to be obtained with an ordinary microscope. Mr. F. Davidson will gladly help any expert microscopist who would like to test the possibilities of his invention.

'Micro-Tele' Cathetometer (The).—The happy idea is here conceived of making the telescope of a cathetometer on the micro-telescopic principle (*Fig.* 124). The result is a wonderful improvement in the efficiency of the instrument. An added advantage lies in the fact that the telescope is easily removed, so that it can be used alone. Magnification can be anything from 20 to 50 diameters, the lower power for preference. The price is £7 10s., from Messrs. F. Davidson & Co., 29, Great Portland Street, W.

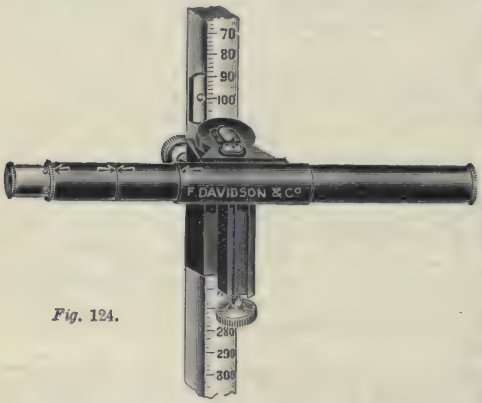


Fig. 124.

'Microtome' (Gruner's).—This instrument can be adapted for CO_2 or ether, the former being much preferred. It is inexpensive and simple in design (*Fig.* 125). The essential difference from the Cathcart microtome lies in the use of an obliquely cutting blade fixed in a handle and actuated on a pivot; the right hand moves the blade rapidly to and fro, while the left hand turns up the screw. The body is cast in aluminium. The instrument is designed to supply the need for an inexpensive freezing microtome of small size for the purpose of rapid diagnosis in the operating-room. It will be found useful for general purposes. Messrs. Reynolds & Branson, of Leeds.

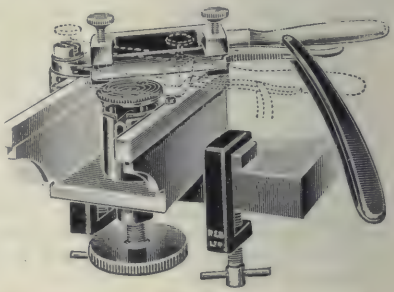


Fig 125.

Mouth Gag.—The gag here illustrated (*Fig.* 126) is made from the design of Mr. Fred. W. Sydenham, F.R.C.S., and is specially adapted for ear and throat surgeons and for the dental profession. The improvements claimed are: (1) The limbs of the cheek portion are long, the joint

being well set back—an essential in easy enucleation of the tonsils by Sluder's method; (2) The ratchet method of opening gives great force, with a gradual yet rapid opening of the mouth, a desideratum when operating without an

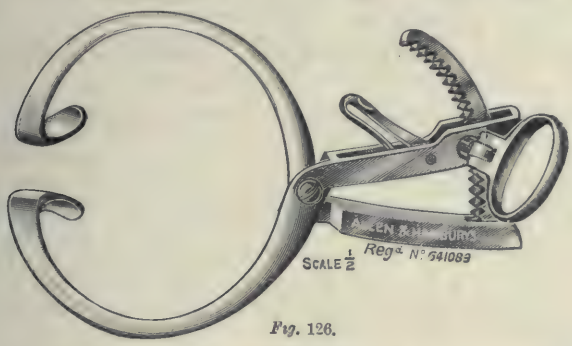


Fig. 126.

anæsthetic; there is also less danger of breaking or extracting the teeth; (3) There are no projections, as the thumbpiece which operates the rachet is provided with a tumble joint, permitting it to lie flat against the cheek; (4) The alveolar projection is at an acute angle, so that it enters the mouth against the incisor teeth at right angles to them, giving the gag a firm hold, with less tendency to slip than is usually the case. It is made by Messrs. Allen & Hanburys Ltd., 48, Wigmore Street, W.

Moynihan's Tube (Improved).— Dr. Wanless has modified Moynihan's tube for washing out the bowel, by the introduction of a collar which slides over the tube (*Fig.* 127). To this collar a piece of india-rubber tubing is attached when the tube is withdrawn for draining the bowel. This addition has proved very convenient. The Holborn Surgical Instrument Co., 26, Thavies Inn, E.C.

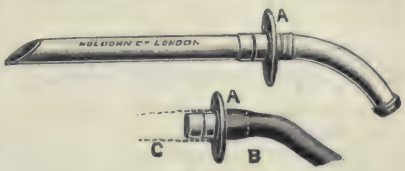


Fig. 127.

Mustard Compress (The Complete).— The value of mustard as a remedy for inflammation and for the relief of pain belongs to forgotten knowledge, because modern methods of applying it are therapeutic atrocities. We can buy 'mustard leaves' at the chemist's which are cartridge papers soaked in essential oil of mustard. They cause a steadily increasing pain, until the patient can bear it no longer, and then they are taken off, leaving a sore skin that is an unhappy reminiscence for many days. We can make an extemporaneous mustard plaster, but it requires as much paraphernalia as a minor surgical operation, and although we give minute directions to the nurse, something generally goes wrong and the skin is blistered.

We speak feelingly, because a mustard compress to the back of the neck is one of our most frequent recommendations for nervous insomnia; as is a daily application over the gall-bladder and liver for hepatic trouble; and also we find nothing so good as mustard in lumbago and muscular rheumatism. We are therefore very glad to have a mustard application that can be instantly applied, which is self-adherent, requires no covering, can be left on for any length of time without the smallest fear of injuring the skin, and which can be repeated daily if required over the same part.

The method is perfectly simple. A measured dose of pure mustard is placed behind a piece of flannel having an impermeable back and edges which are

adhesive when moistened. The mustard never comes in contact with the skin, but its vapour passed through the flannel produces an agreeable sensation of warmth and comfort, congests the skin but does not irritate it, and ceases to produce an effect when the dose is exhausted. The convenience and efficiency of this method are obvious, and it should restore mustard to its proper position of being an agent for soothing pain and arresting inflammation, instead of one which causes both. This is manufactured by the Brytstele Co., 106, High Street, Camden Town, N.W.

Nebulizer (Asthma). — This nebulizer, made by Mr. Frank A. Rogers, 327, Oxford Street, W., is small, light and compact. The fragile parts being carefully and completely protected by a strong, neat, covered wood case; it can be carried in the pocket with safety in any position, without fear of leakage or breakage. This is of great importance when an instrument has to be carried, say, while hunting, golfing, motoring, etc. It is very easy to use and practically noiseless. It reduces the solution to the finest possible vapour for inhalation; no coarse spray can escape, thus the risk of overdose, always a possibility in the older forms of atomizer, is entirely eliminated. While the volume of vapour is very copious, there is no waste of solution, hence it is most economical in use.

Paul's Tube (Improved).—An improved Paul's tube (*Fig.* 128) has been designed by Mr. B. C. Maybury. This tube prevents the bowel from kinking where it passes out through the abdominal wall. The curved part should be inserted into the lumen of the bowel with the opening in the direction in which the fæces flow. Should evacuation not occur, oil or glycerin can be injected through the tube. The multiple flanges on the tube allow for the varying thicknesses of abdominal walls, also for the attachment of rubber tubing. Allen & Hanburys Ltd., 48, Wigmore Street, W.

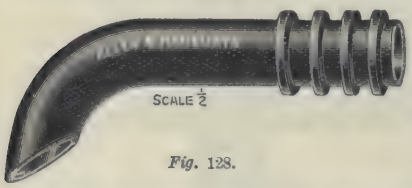


Fig. 128.

Pneumothorax (Artificial Induction of). — The accompanying illustration (*Fig.* 129) shows an instrument on the principle of Potain's trocar suggested by Dr. Clive Riviere, for giving first inductions of pneumothorax safely and without the risk of wounding the lung, which is a drawback in the use of the usual sharp hollow needle used for the purpose. The advantages sought seem to be well attained in this instrument, e.g., the depth of its penetration is controlled by a stop, it can be instantly converted into a blunt instrument as soon as the skin and deep fascia are pierced, and the blunt cannula pushed forward into the pleural cavity without danger. The addition of a stuffing box securely fastened to the mount of the cannula averts the otherwise possible danger of air-embolism should the needle enter a vein.

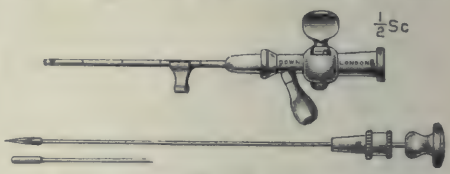


Fig. 129.

In use, the needle is connected by tubing to the manometer with the trocar in place; the slide stop is adjusted to 1 c.m., or somewhat less than the distance between the surface of the skin and the pleura, the instrument is then driven in up to the stop, the stop is drawn back, and the trocar may now be freely withdrawn into the stuffing box, which is held securely in position by a bayonet catch. The tap may now be closed and the trocar removed with its stuffing box; the blunt cannula alone can then be pushed on into the pleural cavity. A blunt guide is supplied for clearing the cannula, with

exactly similar stuffing box and bayonet catch, which may be fixed in place before the tap is opened and the guide pushed forward. It costs 17/6, and is made by Messrs. Down Bros. Ltd., 21–23, St. Thomas's Street, S.E.

Fig. 130.

We also illustrate (*Fig.* 130) a needle and cannula designed by Dr. T. D. Lister. This needle is introduced through a small cannula which is first inserted by a trocar into an intercostal space. The needle is semi-blunt, and has a lateral aperture very close to its extremity. The Holborn Surgical Instrument Co. Ltd.

Dr. Lister has also designed an apparatus (*Fig.* 131) for the production of artificial pneumothorax, which has been well carried out by Messrs. Reynolds & Branson, of Leeds. It looks rather complicated, but it can be readily packed in its case without disconnection of any of the tubes.

The apparatus provides a means of preparing oxygen from perborate of soda with manganese peroxide. The whole working of the apparatus is controlled from one point with a simple indicator; this is of great advantage, as such appliances from the nature of things require many taps, and confusion is otherwise apt to arise.

The apparatus is distinctly practical in design, and is well worked out by the makers. Dr. Lister's article on the subject appears in the *Clinical Journal*, Oct. 21st, 1914.

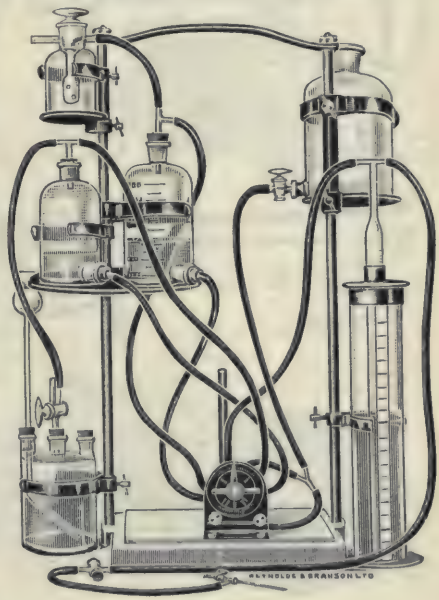


Fig. 131.

Raspatory (New).—Watson-Williams's small raspatory (*Fig.* 132) for the intranasal frontal sinus operation is 2 mm. wide at the tip, and the curve is suitable for almost every case which can be operated on. The handle is hollow, rendering the instrument very light in the hand, as it must, so to speak, find its way up the frontonasal passage resulting from the removal of the anteconchal cells; on no account should it be even gently forced up. When in the sinus it is pressed against the cresta nasalis and drawn down, rasping the crest, the process being repeated till

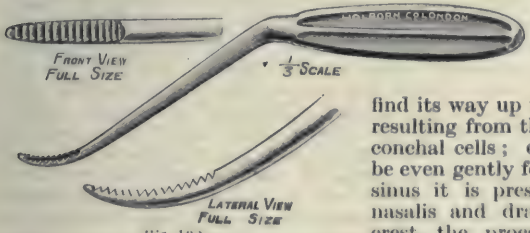


Fig. 132.

the crest is sufficiently reduced. This has been excellently made by the Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C.

Saline Infusion Apparatus.—We illustrate (*Fig* 133) the apparatus designed by Lieut.-Colonel Sir Leonard Rogers for the administration of saline infusions. It has been somewhat improved, as the pear-shaped glass bulb

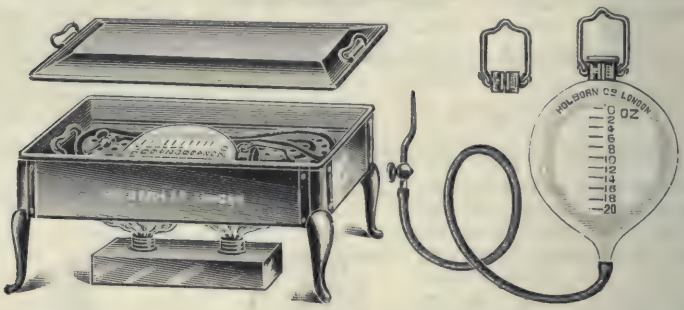


Fig. 133

has now flattened sides to enable it to fit into the sterilizer, and is supplied with a removable collar with loop for suspending it. It is made by the Holborn Surgical Instrument Co., Ltd., 26, Thavies Inn, E.C.

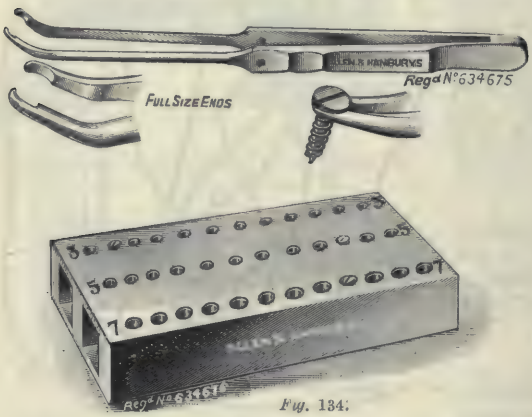


Fig. 134.

Screw-holding Forceps.—These forceps and the magazine platform for screws (*Fig.* 134) were designed by Mr. Percival Cole. The whole can be sterilized and laid upon a sterile towel in a convenient position for the use of the surgeon whilst operating. Messrs. Allen & Hanburys Ltd., 48, Wigmore Street, W., are the manufacturers.

Spray (The Surgeons').—In a review of Mr. Frank A. Rogers' patent Dental Spray in the 1914 *Medical Annual*, the suggestion was made that the principle of the spray might well be applied to sprays for other purposes. The first modification, now ready, takes the form of an iodine spray for use in surgery, and is called 'The Surgeons' Spray'; it is made in two forms, 'service pattern' and 'hospital pattern.' The former, designed for use on the field or on board ship, is fitted with metal pump and is provided with a convenient hook to hang on belt or pocket. The latter and simpler form is provided with a powerful india-rubber bellows. The spray itself, made of vulcanite, with no metal to come into contact with the solution, is used with a conical container. Each spray is provided with an india-rubber stand, which adheres to any smooth surface, by suction, and acts as a most effective preventive of breakage. By holding the spray at any angle between the perpendicular and horizontal, and by turning it laterally in the required

position, the spray may be delivered in any direction, thus offering an immense advantage over ordinary spray producers, with which, the choice of direction being so limited, it is frequently difficult to apply effectively the spray direct to the desired spot without moving the patient.

Spare containers, corked and fitted with vulcanite screw plugs, are supplied, in which, if desired, fresh solution may be carried. When required for use the vulcanite plug is unscrewed and the stem of the spray screwed into the cork in its place; this ensures a perfectly fitting cork with each container.

Fig. 135.—'Service Pattern.'

Fig. 136.—'Hospital Pattern.'

For use with these sprays, Mr. Rogers (327, Oxford St., W.) is preparing supplies of iodine in hermetically sealed tubes; the contents of one of these tubes, dissolved in a given quantity of spirit, provide fresh tincture of iodine as required.

Splint (The 'Lester Sutcliffe'). This is a flat splint made of 'three-ply' wood. Although very strong, it is much thinner than the ordinary splint. A set of 6 assorted sizes, from 16½ to 10 in., weigh 8½ oz., and cost 1/–. They are particularly well adapted for carrying in the emergency bag or haversack, and should prove of great use for military as well as general surgical purposes. They are made by Messrs. Reynolds & Branson Ltd., of Leeds. (*Fig.* 137.)

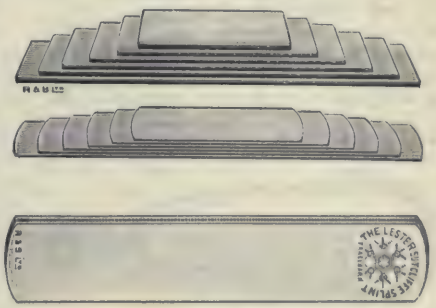


Fig. 137.

Splint (Leg).—A splint designed by Mr. R. D. Mothersole has many advantages over the ordinary back splint. It is made of round wrought iron, $\frac{5}{8}$ in. in diameter, and the ends of the bars which make the sides of the splint are bent underneath and joined together, forming a horse-shoe support both top and bottom, so that the proximal end of the splint is raised about an inch from the surface on which it rests, and the distal end three or four inches. Two short bars of rectangular wrought iron ($\frac{3}{4} \times \frac{5}{8}$ in.)

grooved, so as to grip the sides of the splint, are clamped together, one above and one below, and carry a footpiece made of sheet steel, so that it may be moved up and down the splint and fixed at various angles in a plane at right angles to the g axis of the splint. In the larger sizes it is sometimes advantageous to be able to move the footpiece to right or left of the middle line. This splint is very easily padded. The raising of the splint on its horse-shoe ends enables the limb to be bandaged or unbandaged without lifting it off the bed. The sliding upwards and downwards of the footpiece enables the same splint to fit legs of very different lengths; it is also advantageous to be able to remove the foot-piece if one desires to work the ankle-joint while the limb is resting on the splint. Messrs. Mayer & Meltzer, Great Portland St., W.

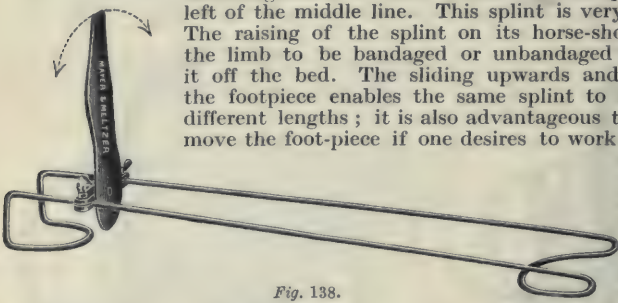


Fig. 138.

Sputum Bottle.—We illustrate here (*Fig.* 139) the 'Holborn Sputum Bottle' and regulation postal tin now used by the principal school clinics This bottle has a much wider opening than those usually employed, and is more convenient for school children to expectorate into. It is fitted with either a boilable rubber cork or ordinary cork. The price of the former, complete with tin, is 6/6 per dozen, and with ordinary corks 3/6 per dozen. The postal tin has a wrapper which gives all directions and saves much trouble in transmission.

Fig. 139.

Stethoscope (The M. A.).—Some years ago we were struck with the remarkable acoustic properties of a miniature ear-trumpet which formed the mouth-piece of a speaking-tube for the deaf. We converted this into a stethoscope with two flexible rubber tubes and vulcanite ear-pieces. Since then we have used this stethoscope in preference to a number we possess, each claiming merits of its own.

We sent Messrs. Reynolds & Branson, of Leeds, a rough sketch of this stethoscope, and in a few days they sent us one which is an improvement upon our design and which we illustrate here (*Fig.* 140). They have surrounded the chest-piece with rubber, so that it never strikes cold to the patient's skin. This is a great advantage, and we find that it does not interfere with the acoustic properties. We believe it will prove the most satisfactory form of stethoscope for ordinary use, and is also very portable. It can be carried loose in the pocket. We should like our readers to try it, and hope they will endorse our opinion.

Fig. 140.

Stethoscope (The Revolving).—By an ingenious arrangement the phonendoscopic end of a stethoscope is made to revolve so that an ordinary chest-piece can be used for the intercostal space or other purpose. The arrangement is also convenient because the little chest-piece can be used with the

tubes pressed to the patient's chest, which is a great advantage when examining under the bedclothes. It is of the ordinary binaural type, with folding

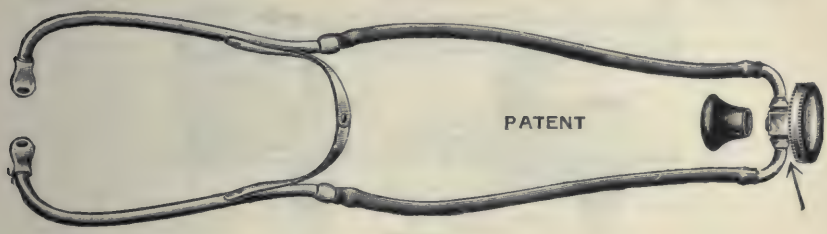


Fig. 141.

spring (*Fig.* 141). The Medical Supply Association, 167–173, Gray's Inn Road, W.C.

Sugar Test.—Dr. Oscar Kraus points out that sugar may exist in excess in the blood before it makes its appearance in the urine. We illustrate here (*Fig.* 142) an apparatus for testing the blood for sugar, which can be done with only fifteen drops of blood. The details of the test were published in the *Lancet*, May 2nd, 1914. The Holborn Surgical Instrument Co. Ltd. supply the apparatus, which costs £2.

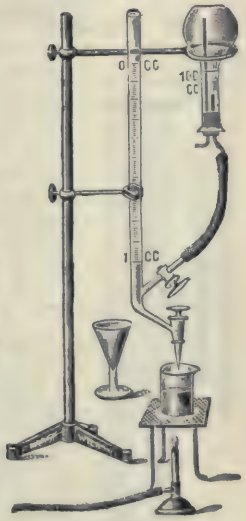


Fig. 142.

Sugar, Test for.—This apparatus has been made at the suggestion of Mr. G. C. Parnell, consulting surgeon to the Infirmary for Sick Children Sydenham. It consists of four tinted glasses of about the size of microscope slides. The colours vary from light yellow to brown, being the exact tints ascertained by experiment of equal volumes of urine containing glucose and KHO when boiled together. The author points out that by Moore's test the tints thus produced vary directly with the amount of glucose in the specimen under examination. The glasses have labels attached showing the percentage of glucose to which the colours correspond. To carry out the test a quantity of urine, which previously has been found by Fehling's test to contain glucose, is boiled for ten seconds with an equal quantity of liquor potassæ, and the colour produced is compared with the test-glasses. If one is found to correspond, the required calculations will be found on its label. For some intermediate tints the glasses can be superimposed upon one another, and the deep colours beyond the range of the set can be met by dilutions and appropriate multiplication of the stated estimation.

The glasses complete, with full directions on cards, enclosed in a neat case, are supplied by Messrs. Down Bros. Ltd., St. Thomas's Street, S.E.

Syringe (Gouvain's).—Dr. Gouvain's syringe for aspirating tuberculous glands (*Fig.* 143) is a 10 c.c. syringe ('Record') with finger bars, and three special steel trocars, silver cannula, and pilot. It is also made with larger trocars, etc., 20 c.c. capacity, for tuberculous abscesses of bony origin. Dr. Gouvain has published a most interesting article on the treatment of tuberculous abscesses by conservative methods. We believe that the Holborn

Surgical Instrument Co. Ltd., who make these syringes, will supply a copy of this to any practitioner who is interested. We consider the treatment he advocates worthy of careful consideration.

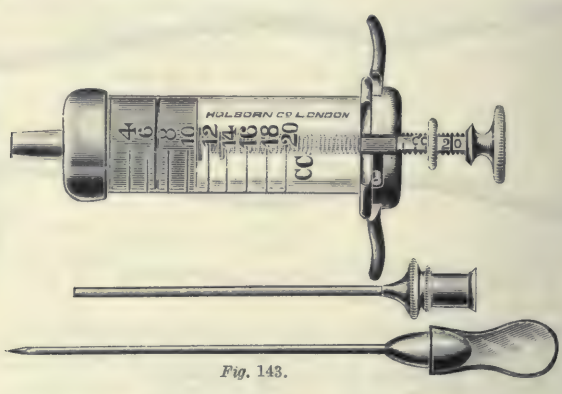


Fig. 143.

Tables (Vitreous).—The aseptic tables are usually stove-enamelled, and the surface can be easily spoiled by hot vessels or acids. The difficulty of making them of vitreous enamel has been due to the fact that they can only be enamelled in pieces, and must be fixed together afterwards; and, also, when cooling down, the plates are apt to cockle. The Holborn Surgical Instrument Co. Ltd., have now overcome these difficulties. The top consists of a cast-iron plate, with four lugs at the corners. These lugs drop into the bore of the tubular legs, and are held tightly by means of a screw which passes through a brass collar on top of the legs. The shelf is also cast in a special mould, and is attached to the legs by four screws. The illustration (*Fig.* 144) shows how the table may be packed into small compass.

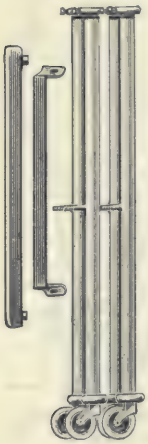


Fig. 144.

Tetanus Preventive Outfit, Hyposol Brand (Allen & Hanburys Ltd.).—This outfit contains one 'Azoule' solution of iodine; one pad of cyanide gauze, and one 'Hyposol' dose of tenanus antitoxin. The iodine solution is powerfully destructive towards tetanus germs and toxin. It can be applied to wounds likely to be infected with the bacillus of tetanus; both ends of the glass capsule should be broken off at the file-marks, and the solution applied to the open wound, which may then be covered with the gauze. A little of the iodine solution should also be employed to sterilize the skin over a suitable position in the flank or lower part of abdomen for injection of the tetanus antitoxin. Tetanus antitoxin is injected to prevent the onset of tetanus. The dose contains 750 units. The 'Hyposol' should be prepared according to directions in lid of box. A large fold of skin in the flank or abdomen (previously painted with iodine) is taken up between the thumb and forefinger of the left hand, and the needle pushed well into the loose subcutaneous tissue. The serum is then injected and allowed to absorb naturally.

Tonsillectome.—The tonsillectome shown in *Fig.* 145, designed by Dr. George Elphick, of St. Mary's Hospital, has a combined crushing and cutting action, ensuring an operation which is practically bloodless, and the com-

plete enucleation of the tonsil. It is made by Messrs. Allen & Hanburys Ltd., 48, Wigmore Street, W.

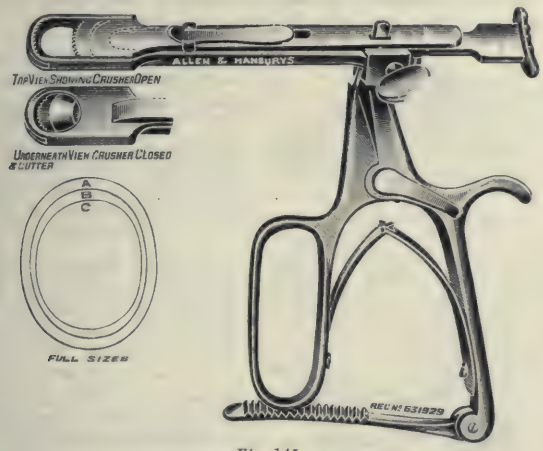


Fig. 145.

Tray (Surgical).—This is a nickel-plated metal tray, made to the suggestion of Mr. Victor Bonney, for holding instruments when the patient is placed in the Trendelenberg position. The illustration (*Fig.* 146) exactly depicts the method of use, showing the tray covered with a sterile towel upon which the instruments are placed ready for the operator's use. Every surgeon will recognize the great convenience and practicability of this simple invention. It is made by Messrs. Allen & Hanburys Ltd., 48, Wigmore St., W.

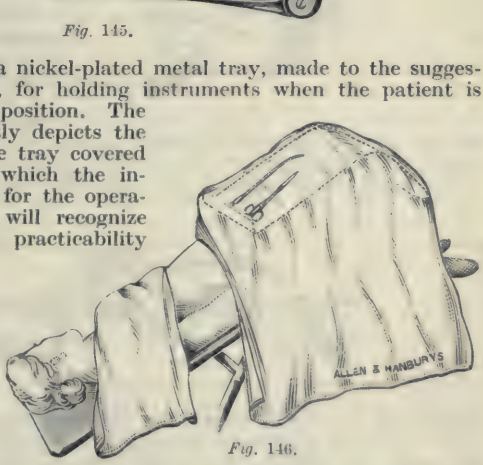


Fig. 146.

Tuning Fork (Cantlie's).—Mr. James Cantlie, F.R.C.S., has used a tuning-fork with great success as an aid to outlining with precision both the solid and hollow viscera. The principle involved in the use of the tuning-fork-stethoscope method is that when the stethoscope is placed over an organ, be it a solid organ such as the liver, spleen, heart, etc., or a hollow organ such

Fig. 147.

as the stomach or cæcum, and the vibrating tuning-fork is applied on the surface of the body over one or other of these organs, the note of the tuning-fork manifests by its loudness the limit of the organ under examination, and the moment the limits are passed the note becomes faint, distant,

or inaudible. Mr. Cantlie's article appeared in the *British Medical Journal*, Feb. 21st, 1914. Tuning-forks adapted for this purpose (*Fig.* 147) are made by Messrs. Meyer & Meltzer, 71, Great Portland Street, W., and the Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C.

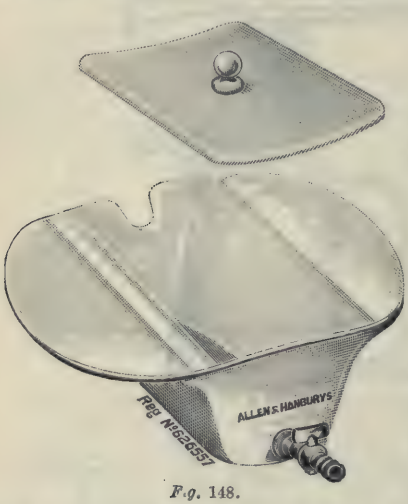


Fig. 148.

Urethral Irrigating Trough.—This is made by Messrs. Allen & Hanburys Ltd., at the suggestion of Mr. Canny Ryall, F.R.C.S. The trough is strongly constructed of white glazed earthenware, provided with a lid and wide bore outlet, to which is attached a nickel-plated draining stopcock. (*Fig.* 148.)

Urethral Irrigator.—The urethral irrigator designed by Mr. Fredk. H. Pickin avoids the spilling of the lotion and its attendant trouble. The apparatus (*Fig.* 149) consists of a metal pipe (similar to that sometimes used for irrigating wounds) with a thumb-push stopcock (E) for turning on and off, and regulating the flow of the irrigating fluid. The pipe, to which the rubber tube from the reservoir of the irrigator is connected at F, terminates in a small double channel (B), to the backflow of which a piece of tubing is attached (C) by a simple metal push joint. This tubing passes back to a receptacle through a ring (D), which conducts it under the thumb-push in such a manner

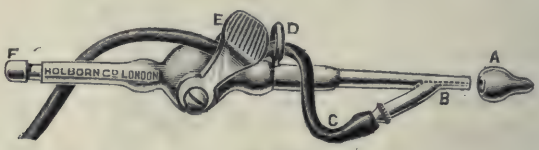


Fig. 149.

that it can be readily compressed between the anterior edge of the push and the upper surface of the pipe. A detachable metal urethra nozzle (A) caps the double channelled end of the pipe. The apparatus is made by the Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C.

Water-Testing and Sterilizing Outfit (Parke, Davis & Co.). — This outfit contains a supply of full-strength chlorinated lime (in glass tubes) for sterilizing water and rendering it safely potable, also tubes of tablets of soluble starch and potassium iodide for testing purposes, as recommended by Professor Sims Woodhead. (See articles in *The Lancet* and *British Medical Journal* of September 19, 1914).

The complete outfit is supplied in cardboard cases or in japanned metal boxes, with full directions for use. Refills of the various chemicals are also supplied separately.

PROGRESS OF PHARMACY, DIETETICS, &c.

Alkagen (Allen & Hanburys Ltd.).—We are very favourably impressed with this simple preparation. The lozenges and tablets consist of magnesium hydroxide, which is a much more powerful antacid than bicarbonate of soda, flavoured with peppermint. For mild flatulent dyspepsia they provide a comfortable and pleasant means of relief.

Anterior Lobe (Pituitary Gland) Tablets (Parke, Davis & Co.). — Some clinicians incline to the belief that certain disturbances of metabolism, etc., are benefited by the administration of the anterior lobe of the pituitary body. This treatment has been adopted with more or less success in cases of delayed physical and mental development in children of neurotic type, also of mongolian imbecility, suppressed menstruation, menorrhagia without discoverable cause, obese type of sexually infantile pituitary dystrophy, etc. Each of these tablets represents 2½ grains of the desiccated anterior lobe of the pituitary body. The average dose is 5 grains, two or three times daily, according to indications. The tablets are supplied in bottles of 25 and 100.

Antidypso. Conc., Mist., is prepared by Messrs. C. J. Hewlett & Son Ltd., for the treatment of the alcoholic habit. It contains atropine and strychnine, with gentian and cinchona, and is designed for administration in conjunction with hypodermic injections of the two alkaloids. During the use of these measures the amount of alcohol is gradually reduced. Further details will be supplied by the manufacturers.

Antimeningitic Serum (Parke, Davis & Co.).—This serum is obtained from the blood of horses which have been successively inoculated with endotoxins, killed cultures, and finally with live cultures of a number of strains of *Diplococcus intracellularis meningitidis* (Weichselbaum) It is employed in the treatment of epidemic cerebrospinal meningitis, the mortality from which has been greatly reduced since the introduction of the serum. The serum is administered subdurally after the withdrawal of cerebrospinal fluid ; particulars of dosage, etc., accompany each bulb. Supplied in bulbs containing 15 c.c.

Aqua Magnesic.—This is practically a solution of sulphate of magnesia with oxygen in loose combination, so that it is semi-nascent. When a teaspoonful is added to a wineglassful of water, it makes the water taste like cold spring water, and there is an entire absence of the bitterness and unpleasantness of solutions of Epsom salts or the German mineral waters. When in regular use for gout and rheumatic troubles, one teaspoonful in a wineglassful of water before breakfast is the usual dose, a similar dose being given at bedtime when there is constipation. It unquestionably causes the elimination of acid from the tissues, and has a tonic effect upon the digestive system. Being quite palatable it is very popular with patients. The Brytstele Co., 106, High Street, Camden Town, London, N.W.

Bipalatinoids. — Messrs. Oppenheimer's Bipalatinoids are too well known already to call for more than passing mention. Possibly, however, there are practitioners who are not aware how many are the medicaments put up for administration in this convenient and reliable form. To such we would suggest the advisability of perusing the lists issued by this firm.

Bynochrismol. — This is yet another addition to the valuable series of malt compounds for which we have to thank Messrs. Allen & Hanburys. In it they have combined malt with chrismol, which is a specially refined paraffin. The result is a palatable and trustworthy preparation of paraffin, which can be cordially recommended for prescription to patients who are debarred from the ordinary paraffin preparations by their oiliness.

Chinamin (Allen & Hanburys Ltd.) is a sterile solution containing a neutral and non-irritating salt of quinine in combination with adrenin and a distillate of hamamelis. Applied every two or three hours to the nasal mucosa as a fine spray, it affords rapid relief to nasal catarrh.

Cider.— Under the name of the "Doctor's Vintage Pure Cider," the Quantock Vale Cider Co. Ltd., of North Petherton, Bridgwater, Somerset, have produced a wine of apples which is a credit to the West of England. It is obviously made with that care and attention to the apples from the time they are picked which is essential to good cider, and fermented under the scientific conditions by which a definite and pleasing result can be relied upon. It is supplied in three grades: *Sweet*, with 6 per cent sugar and 3½ per cent alcohol; *Dry*, with 3 per cent sugar and 4½ per cent alcohol; and *Extra Dry*, with ½ per cent sugar and 5½ per cent alcohol. The physician therefore knows exactly what he is ordering, and even if the 'extra-dry' is selected, it is free from that acidity which is usually associated with ciders which claim this character. We can cordially recommend it, and especially so as the price is reasonable, the large champagne bottles of either variety being 7/6, and the half-bottles 4/6, per dozen.

Colloidol Metals are issued in sterules, ready for hypodermic or intravenous injection, by Mr. W. Martindale. They have been used with an encouraging measure of success in various infective diseases, such as pneumonia, typhoid, gonorrhœa, etc. This firm has issued colloidal preparations of gold, copper, mercury, platinum, sulphur, selenium and silver.

Collosols are similar in nature to the preparation just described. They may be given subcutaneously, intramuscularly, or intravenously. Messrs. Oppenheimer, Son & Co. have sent us their "Collosol Ferrum," a stable solution of iron in the colloidal state, for the treatment of simple and infective anæmias.

Cuprentum (Allen & Hanburys Ltd.) is an ointment containing 5 per cent of copper citrate in a soluble form, specially prepared for ophthalmic use in trachoma, ulcerations, and granulations of the eyelids, etc. Cuprentum is sold in jars with glass rod (retail 2/–) at 18/6 per doz.

Cymarin.—This cardiac tonic is noticed elsewhere in the body of this volume, and all that need be said here is that it is sent out for use by the Bayer Co. Ltd., in two forms: a tablet for oral administration, and an ampoule for intravenous injection.

Elarson, introduced to this country by the Bayer Co. Ltd., has received commendatory notice in the German journals as an organic vehicle of arsenic, which constitutes 13 per cent of the compound. It is credited with this advantage, that it does not break up till the small bowel is reached, so that gastric irritation is avoided. Each tablet contains ·5 mgrams of arsenic, and the therapeutic applications are those of arsenic.

Energen Gluten Bread and Biscuits, manufactured in this country and said to be unique in this respect, are palatable and not likely to disgust the diabetic patient, as are some of the gluten breads we have met with. It is not claimed that these foods are free from glycogenous carbohydrate, as a proportion of starch is included to render them palatable. For further details, Messrs. Maurice & Co., Bedford Chambers, Covent Garden, W.C., should be consulted.

'Hæmorrhoidal' preparations, forwarded to us by Messrs. Allen & Hanburys Ltd., are of two kinds. The suppositories contain balsam of Peru, resorcin, iodol, and suprarenal extract. These form a valuable combination for allaying the discomforts of internal piles. The 'Ung. Hæmorrhoidal' is also an admirable preparation, of the greatest service in allaying anal itching. It contains phenol, zinc oxide, and cocaine in a lanolin base.

Helicon should meet with a hearty welcome. Prepared at the Castle Laboratory, Jeffreys Place, London, N.W., it is the English equivalent of aspirin, being acetyl-salicylic acid put up in tablet and powder form. Clinically its results are those of aspirin, and it is the duty of British practitioners to see that it finds its way into general use instead of the German product.

Hetroform is a benzoate of hexamethylenetetramine, prepared by Chas. Zimmermann & Co., for use as an urinary antiseptic. On theoretical grounds this should be an excellent preparation, but it is possible that its usefulness may be somewhat diminished by its low solubility in water. It is sent out for administration in tablet form.

Iodine Capsules (Mr. W. Martindale), encased in cotton-wool and silk, are to be used as a first dressing for wounds, by snapping the capsule and rubbing the dressing thus produced over the damaged area. We have found this contrivance very useful as an emergency outfit for the preparation of minor operation areas.

Iodostarin (Hoffmann-La Roche Chemical Works Ltd.) is another addition to the host of organic iodine compounds. It contains almost 50 per cent of iodine, but owing to the fact that it does not break up till the small intestine is reached, it has no irritant action on the stomach. It is tasteless and odourless.

Istin (The Bayer Co. Ltd.) is a synthetic laxative having a formula closely akin to that of the active principle of rhubarb. Its action is confined to a stimulation of colon peristalsis. The urine may be coloured reddish by its administration. The dose is 5 grains, and it is issued in tablet form.

Lactic Acid Bacteria Vaginal Suppositories (Parke, Davis & Co.).—These suppositories present in compressed form living cultures of lactic acid bacteria. They are employed as an auxiliary to the treatment of certain gynæcological diseases, having proved of value in the treatment of leucorrhœa, vaginitis (not gonococcal), and erosion of the cervix. The suppositories are almond-shaped; they do not contain any galenical or metallic drug, do not stain, and do not leave any residue. In the treatment of cervical and vaginal leucorrhœa, one suppository may be inserted at bedtime daily for one week, then every alternate night until symptoms have subsided. In cases of dysmenorrhœa the use of 1 or 2 suppositories daily for one week before the menstrual period promotes free drainage and relief from pain. The suppositories are supplied in boxes of 1 dozen.

Locosthetic (Parke, Davis & Co.).—This is a combination of cocaine with adrenalin, which, we believe, already enjoys a wide popularity among dental surgeons. It is sent out in a bottle covered with a rubber cap, which can be sterilized and pierced with the needle of the hypodermic syringe, prior to injection into the gum for simultaneous antiseptic and astringent purposes.

Lysol Substitutes. — In this country we have learned to rely upon lysol for many purposes, so that it is not surprising to find British firms competing to secure the market vacated by the cutting off of the original German product, by offering similar preparations of their own. We have received four of these, and find them satisfactory so far as we have been able to test them. Each and every one fills the place of the German product quite well. We do not propose, therefore, to institute comparisons between them, but we suggest to our readers that they should apply to the firm in whom they have most confidence. The products sent are **Celtol** (August Reichwald Ltd., Finsbury Pavement House, E.C.), **Creosalgen** (C. J. Hewlett & Son Ltd., 35–42, Charlotte Street, E.C.), **Lysol** (Chas. Zimmermann & Co. Ltd., 9 & 10, St. Mary-at-Hill, E.C.), and **Mycetol** (Allen & Hanburys Ltd., 37, Lombard Street, E.C.). The firm first named, who are agents for the Celtic

Chemical Co., Glasgow, also supply **Celtyl** and **Celtic Cross** disinfectant fluids, and **Celtolene**, a liquid antiseptic soap. All these are designed for the cleansing of floors and walls, and such-like purposes. Messrs. Hewlett have sent us a 'Surgical Creosalgen Jelly,' a 1 per cent combination with a lanolin base, which will be found an excellent lubricant for midwifery and so on. A somewhat similar preparation is the 'Lysol Petroleum Jelly' of Messrs. Zimmermann. It is hardly necessary to add that a British origin is guaranteed for each of these products.

Malt Extract with Paraffin (Wander).—To their excellent crystalline malt extract, Messrs. A. Wander Ltd. have succeeded in adding liquid paraffin, which constitutes 50 per cent of the compound. In this way the oiliness of the paraffin is pleasantly disguised and the laxative effect reinforced by that of the malt. The dose suggested is one tablespoonful three times daily.

Menthymoline Tablets are produced by Messrs. C. J. Hewlett & Son Ltd. They contain mild antiseptics such as thymol, menthol and the like, and constitute a pleasant remedy for mild grades of oral sepsis and similar maladies.

Peptogenic Milk Powder (Fairchild Bros. & Foster).—This well-established preparation is being issued by the Agents, Messrs. Burroughs Wellcome & Co., in a convenient form. The screw cap of the bottle is designed to act as a measure for the powder, so that inaccuracy in preparation is safeguarded against.

Phenolsulphone-phthalein, used extensively as a means of testing the functional efficiency of the kidneys, and alluded to in this connection in the present volume, is sent out by Mr. W. Martindale in sterules for hypodermic injection.

Renaglandin Ointment is sent us by Messrs. Oppenheimer as containing 10 per cent of their suprarenal extract. It is likely to prove very acceptable as an application for external piles and such-like lesions of the mucous membranes.

In their **Renaglandin Rectones** the same principle has been embodied in suppository form, for use in the treatment of internal piles.

'Roskrow' Natural Water, sent to us by Mr. W. Martindale, of 10, New Cavendish Street, W., is said to be twenty-six times as radio-active as the most radio-active natural water examined hitherto by this firm in Britain. Being relatively free from minerals, there is no fear of purgative action. As is well known, many spa physicians have discovered much benefit from the therapeutic use of radio-active natural waters in gout, rheumatic affections, and the other troubles that take patients to spas; along these lines Roskrow water is indubitably worthy of extended trial.

Sedobrol is issued by the Hoffmann-La Roche Chemical Works Ltd. with the idea of avoiding some of the drawbacks attendant on the administration of the ordininary organic bromides. The tablets consist of sodium bromide, 17 grains in each, combined with bouillon extract, and forming a palatable broth on solution in a cup of hot water. It is thus destined to play a useful part in the salt-free diet of epilepsy, since it can be used to impart flavour to the insipid dishes of that dietary.

Vaccines (Parke, Davis & Co.).—*Antisepsis Vaccine* contains in each c.c. 25 millions of streptococci from cases of lymphangitis, erysipelas, and cellulitis, and 500 millions of staphylococci from carbuncles and furuncles. It may be used both for the prevention and treatment of septic infection of gunshot and other wounds, in particular, shattering wounds of bones and compound fractures. For *prophylactic purposes*, 1 c.c. of the undiluted vaccine may be administered as soon as possible after the wound is received. This measure is also indicated prior to any operative procedure during and

after which absolute asepticity cannot be guaranteed. For *therapeutic purposes*, much smaller doses are requisite. The vaccine should be diluted ten-fold with boiled water, and for cases with very little constitutional disturbance 1 c.c. of the dilution may be given every three days. Where the constitutional disturbance is more serious, 0·5 c.c., or in very serious cases only 0·25 c.c., of the ten-fold dilution should be given ; these doses may be repeated daily, governed by the indications of the temperature. Supplied in bulbs of about 1 c.c., also in bottles of 25 c.c.

Mixed Vaccine for Coliform Infections is prepared from four different types of coliform microbes, obtained in each case from a genito-urinary or peritoneal infection, and issued for the treatment of cases of coliform infection where it is impracticable to prepare an autogenous vaccine. It is issued in two dilutions. Dilution C1 contains in each c.c. 20 millions of *B. coli communis* and 20 millions of *B. coli communior*, with 8 millions of *B. lactis aerogenes* and 4 millions of *B. acidi lactici*. Dilution C2 contains five times the above-stated quantities of the several microbes.

The use of this vaccine is chiefly indicated in cases of urinary infection : (1) cases of chronic bacilluria without pyrexia or marked anæmia, and (2) bacilluric cases with either pyrexia or marked anæmia ; in the latter class only very small doses should be employed. The minimum effective dose of Dilution C1 will be about ¼ c.c. The medium dose in an ordinary case is, approximately, ½ c.c. In less severe cases treatment may be commenced with ¼ c.c. and the dose gradually increased until it produces a slight amount of constitutional disturbance. A somewhat smaller dose should then be given, and repeated every 7 or 10 days, only being increased when it loses its effect. The same principle applies to the treatment of cases of colitis associated with coliform infection. Supplied in bulbs of about 1 c.c., also in bottles of 25 c.c.

Typhoid Vaccine for use in the Treatment of Typhoid Fever.—The St. Mary's Hospital Department for therapeutic inoculation is now issuing a vaccine containing 100 millions of typhoid bacilli per c.c. for use in the treatment of typhoid fever. This vaccine is much weaker, of course, than that hitherto (and now also) supplied for prophylactic purposes. The minimum effective dose in a case of typhoid fever is from 20 to 80 millions ; medium doses, from 40 to 100 millions. This vaccine is supplied in bulbs of about 1 c.c., also in bottles of 25 c.c.

Whooping-Cough Vaccine contains 250 millions of Bordet's bacilli and 10 millions of pneumococci per c.c. As the pneumococcus is constantly found in the sputa of whooping-cough children, it is associated in this vaccine with Bordet's bacillus, which is either the causal agent of whooping-cough or an omnipresent secondary infection. A suitable dose for infants (by whom it is well borne) is 0·2 c.c. (about 4 minims), representing 50 millions of Bordet's bacillus and 2 millions of pneumococci. For older children, larger doses are requisite, a child of 5 years or over should receive the full dose of 1 c.c. This vaccine is supplied in bulbs of about 1 c.c., also in bottles of 25 c.c.

BOOKS OF THE YEAR.

A List of the Principal Medical Works and New Editions Published during 1914.

*** For the convenience of our readers any of the works in this list can be obtained from Messrs. John Wright & Sons Ltd., "Medical Annual" Offices, Bristol.*

AMBULANCE AND NURSING.

Ambulance Examination Questions. A Catechism on "First Aid to the Injured and Sick." By D. M. Macdonald. Small 8vo. Interleaved. 7th ed. *John Wright & Sons Ltd.* - - *Sewed, Net* 6*d.*

British Red Cross Handbook. With Diagrams for use at Lectures. 8vo. pp. 112. *H. Milford* - - - - *Limp, Net* 1*s.*

British Red Cross Society Hygiene and Sanitation Manual. By Lieut.-Col. S. Guise Moores. No. 4. 12mo, pp. 202. 6 Plates, 73 Illus. *Cassell* - - - - - - - - *Net* 1*s.*

Chemistry and Toxicology for Nurses. By P. Asher. 12mo, pp. 190, *W. B. Saunders Co.* - - - - - - *Net* 6*s.*

Chemistry for Nurses. By Reuben Ottenberg. Cr. 8vo. *Macmillan & Co.* - - - - - - - - *Net* 4*s.* 6*d.*

Compendium of Aids to First Aid. By N. Corbet Fletcher. 16mo, limp. *Bale* - - - - - - - *Net* 6*d.*

Complete Handbook for the Hospital Corps of the U.S. Army and Navy and State Military Forces. By Charles F. Mason. New ed. Demy 8vo, pp. 600. Illus. *Bale* - - - *Net* 20*s.*

Explanatory Lectures for Nurses and their Teachers. By H. Hawkins-Dempster. Demy 8vo, pp. 236. *John Wright & Sons Ltd.* *Net* 3*s.* 6*d.*

Finny's (Dr.) First Aid. By W. E. St. L. Finny. A Notebook for Ambulance Students. Cr. 8vo, limp. *T. Murby* - - *Net* 6*d.*

"First Aid" to the Injured and Sick. An Advanced Ambulance Handbook. By Drs. Warwick and Tunstall. 8th ed., reprint. Feap 8vo, pp. 262. Coloured Diagrams. 300 Illus. *John Wright & Sons Ltd. Leather, Net* 2*s.* 6*d.*; *Paper, Net* 1*s.*

First Lines in Nursing. By E. Margaret Fox. Cr. 8vo, pp. 120. *Scientific Press* - - - - - - *Net* 2*s.* 6*d.*

Lectures on Medical Diseases for Nurses. By David Forsyth. Cr. 8vo, pp. 230, 20 illus. *Baillière* - - - - *Net* 3*s.* 6*d.*

Lectures to Nurses. By Margaret S. Riddell. Being a complete Series of Lectures to Probationary Nurses in their first, second, and third years of training. Cr. 8vo, pp. 364. *Scientific Press* - - *Net* 3*s.* 6*d.*

Manual for Nurses. By Sydney Welham. Cheaper ed. Cr. 8vo, pp. 240. *Mills & Boon* - - - - - *Sewed, Net* 1*s.*

Manual of Nursing: Medical and Surgical. By Laurence Humphry. 36th ed. Cr. 8vo, pp. 268. *C. Griffin* - - - 3*s.* 6*d.*

Manual for St. John Voluntary Aid Detachments. By George E. Twiss. 2nd ed. 16mo. *St. John Ambulance Assoc.* *Sewed, Net* 6*d.*

Night Nurse, The. By J. Johnston Abraham. New and cheaper ed. Cr. 8vo, pp. 322. *Chapman & Hall* - - - *Net* 2*s.*

NURSES' "ENQUIRE WITHIN." By E. M. Clarke. New ed., with much Additional Information. 16mo, pp. 224. *Scientific Press* *Net* 2*s*.

NURSING MANUAL FOR NURSES AND NURSING ORDERLIES. By Duncan C. L. Fitzwilliams. *Oxford Medical Publications*. Cr. 8vo, pp. 466. 106 illus. *H. Frowde* - - - - - *Net* 6*s*.

NURSING MIRROR POCKET ENCYCLOPÆDIA AND DIARY, 1915. 16mo, limp. *Scientific Press* - - - - - - *Net* 6*d*.

NURSING IN WAR TIME. By M. N. Oxford. Lessons for the Inexperienced. 12mo, pp. 128. *Methuen* - - - - - *Net* 1*s*.

OUTLINES OF NURSING. By Violet Young. 32mo, limp. *Scientific Press* *Net* 1*s*.

PRACTICAL BANDAGING, INCLUDING ADHESIVE AND PLASTER-OF-PARIS DRESSINGS. By E. L. Eliason. 8vo. *Lippincott* - - *Net* 6*s*.

PRACTICAL INSTRUCTION IN CUTTING OUT AND MAKING UP HOSPITAL GARMENTS FOR SICK AND WOUNDED. By E. Peek. 12mo, pp. 109. *Bale* - - - - - - - *Net* 1*s*.

PRACTICAL NURSING. By A. C. Maxwell and A. E. Pope. Text-book for Nurses. 3rd ed., revised and much enlarged. Illus. Cr. 8vo, pp. 890. *Putnam* - - - - - - - *Net* 7*s*. 6*d*.

PRACTICAL NURSING. By Isla Stewart and H. E. Cuff. Revised and enlarged by H. E. Cuff, assisted by W. T. Gordon Pugh. 4th ed. Cr. 8vo, pp. 448. *Blackwood* - - - - - *Net* 5*s*.

QUESTIONS ON SICK NURSING AND HOME HYGIENE. By D. M. Macdonald. 4th ed. *John Wright & Sons Ltd.* - - *Sewed, Net* 6*d*.

SHORT CUTS TO FIRST AID. By a Metropolitan Police Surgeon attached to the R.A.M.C. Narrow 12mo, limp. *S. Paul* - - *Net* 7*d*.

SICK-ROOM COOKERY SIMPLIFIED. By Mabel Baker. With Suggestions for Diet. Cr. 8vo, pp. 160. *Bell* - - - - *Net* 1*s*. 6*d*.

SURGICAL AND MEDICAL DRESSINGS AND OTHER APPLICATIONS. By M. R. Hosking. *Pocket Guide Series*. 16mo, limp, pp. 124. *Scientific Press* *Net* 1*s*.

WAR COOKERY BOOK FOR THE SICK AND WOUNDED. By Jessie M. Laurie. Cr. 8vo, pp. 60. *T. W. Laurie* - - - - *Sewed*, 6*d*.

WHOLE ART OF BANDAGING, THE. By Thekla Bowser. Fcap. 8vo, limp, pp. 120. *Bale* - - - - - - *Net* 1*s*.

WHY AND WHEREFORE IN FIRST-AID. By N. Corbet Fletcher. 16mo. limp, pp. 107. *Bale* - - - - - - *Net* 6*d*.

WOMEN'S VOLUNTARY AID DETACHMENTS, MANUAL FOR. By Lieut.-Col. P. C. Gabbett, M.R.C.S., I.M.S. (retired). 2nd ed., reprint. *John Wright & Sons Ltd.* - - - - - - *Net* 1*s*.

ANATOMY AND PHYSIOLOGY.

ANATOMIST'S NOTEBOOK. By A. Melville Paterson. A Guide to the Dissection of the Human Body. Demy 8vo, pp. 352. 26 Illus. *H. Frowde* - - - - - - - - *Net* 6*s*.

ANATOMY OF THE HUMAN SKELETON. By J. E. Frazer. 4to. 219 Illus. *Churchill* - - - - - - - - *Net* 21*s*.

BRITISH RED CROSS ANATOMICAL DIAGRAMS. Six Linen Charts, 5ft. by 3ft. *H. Milford* - - - *Each, Net* 7*s*. 6*d*.; *Sets, Net* 30*s*.

CUNNINGHAM'S MANUAL OF PRACTICAL ANATOMY. Revised and edited by Arthur Robinson. 6th ed. Vol. I. Limbs and Abdomen. Cr. 8vo, pp. 673. 16 Plates. 255 Illus. Vol. II. Thorax: Head and Neck. Pp. 636. 11 Plates. 267 Illus. *H. Frowde* - *Each, Net* 10*s*. 6*d*.

DISSECTION METHODS. By D. G. Metheny. 8vo, pp. 131. Illus. *W. B. Saunders Co.* - - - - - - *Net* 6*s*.

ELEMENTARY PRINCIPLES OF GENERAL BIOLOGY. By J. F. Abbott. Cr. 8vo. *Macmillan* - - - - - *Net* 6*s*. 6*d*.

ESSENTIALS OF CHEMICAL PHYSIOLOGY, THE. By W. D. Halliburton. 8th ed. 8vo, pp. 334. *Longmans* - - - - *Net* 5*s*.

ESSENTIALS OF HUMAN PHYSIOLOGY. By D. Noël Paton. 4th ed., revised and enlarged. Demy 8vo, pp. 582. *W. Green* - - *Net* 12*s.*

HANDBOOK OF ANATOMY FOR STUDENTS OF MASSAGE. By Margaret E. Björkegren. Demy 8vo, pp. 232. 73 Illus. *Baillière* - *Net* 3*s.* 6*d.*

LANDMARKS AND SURFACE MARKINGS OF THE HUMAN BODY. By L. B. Rawling. 5th ed. Demy 8vo. 29 Plates. *H. K. Lewis* *Net* 5*s.*

MANUAL OF ANATOMY: SYSTEMATIC AND PRACTICAL, INCLUDING EMBRYOLOGY. By A. M. Buchanan. 2nd Impn. Demy 8vo, pp. 1572, 631 Illus. *Baillière* - - - - - - *Net* 21*s.*

MANUAL OF PHYSIOLOGY. By G. N. Stewart. 7th ed. Demy 8vo. pp. 1156. 467 Illus. *Baillière* - - - - - *Net* 18*s.*

MANUAL OF SURGICAL ANATOMY. By Charles R. Whittaker. 2nd ed., revised and enlarged. Cr. 8vo, pp. 352. 63 Coloured and other Illus. *Livingstone* - - - - - - - *Net* 6*s.*

NEWER PHYSIOLOGY IN SURGICAL AND GENERAL PRACTICE, THE. By A. Rendle Short. 3rd ed., revised and enlarged. Cr. 8vo, pp. 268. *J. Wright & Sons Ltd.* - - - - - *Net* 5*s.*

OUTLINES OF CHORDATE DEVELOPMENT. By W. E. Kellicott. Demy 8vo. 185 Illus. *Constable* - - - - - *Net* 10*s.* 6*d.*

PHYSIOLOGICAL PRINCIPLES IN TREATMENT. By W. Langdon Brown. 3rd ed. Cr. 8vo, pp. 416. *Baillière* - - - *Net* 5*s.*

PHYSIOLOGY AND HYGIENE. By Elizabeth S. Chesser. For Girls' Schools and Colleges. Cr. 8vo, pp. 240. *Bell* - - - *Net* 2*s.*

PHYSIOLOGY OF THE NERVOUS SYSTEM. By Professor J. P. Morat. Translated and Edited by H. W. Syers. Demy 8vo. 263 Illus. plain and coloured. New Edition, cheaper. *Constable* - - 14*s. Net*

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QUAIN'S ELEMENTS OF ANATOMY. Edited by Sir Edward Albert Schäfer. Vol. II, Part 2.—Splanchnology. By Johnson Symington. Roy. 8vo. *Longmans* - - - - - - - *Net* 10*s.* 6*d.*

TEXT-BOOK OF EMBRYOLOGY. By E. W. MacBride. Vol. I.—Invertebrata. Demy 8vo, pp. 724. *Macmillon* - - - - *Net* 25*s.*

TEXT-BOOK OF GENERAL EMBRYOLOGY. By Wm. E. Kellicott. Demy 8vo, pp. 376. 168 Illus. *Constable* - - - - *Net* 10*s.* 6*d.*

BACTERIOLOGY.

BACTERIOLOGY. 2nd ed. Two Parts. *Catechism Series.* Cr. 8vo *Livingstone* - - - - - - *Net* 1*s.*

BACTERIOLOGY FOR NURSES. By Isabel McIsaac. 2nd ed., revised. Cr. 8vo. Illus. *Macmillan* - - - - - - *Net* 5*s.* 6*d.*

ELEMENTARY BACTERIOLOGY FOR NURSES. By G. Norman Meachen. Cr. 8vo, pp. 92. *Scientific Press* - - - - *Net* 2*s.*

MANUAL OF BACTERIOLOGY, CLINICAL AND APPLIED. By R. Tanner Hewlett. 5th ed. Demy 8vo, pp. 680. 26 Plates 69 Illus. *Churchill* *Net* 10*s.* 6*d.*

TEXT-BOOK OF BACTERIOLOGY. A Practical Treatise for Students and Practitioners of Medicine. By P. H. Hiss, Jr., and H. Zinsser. 2nd ed. Roy 8vo, pp. 766. 155 Illus. - - - - *Net* 15*s.*

CANCER.

DIAGNOSIS OF THE MALIGNANT TUMOURS OF THE ABDOMINAL VISCERA. By R. Schmidt. Translated by J. Burke. Imperial 8vo, pp. 361. *Wm. Heinemann* - - - - - - *Net* 17*s.* 6*d.*

THE CANCER PROBLEM. By W. S. Bainbridge. 8vo. Illus. *Macmillan* *Net* 17*s.*

THE CANCER PROBLEM. By C. E. Green. A Statistical Study. 3rd ed. Demy 8vo, pp. 106. *W. Green* - - - - *Net* 5*s.*

CHEMISTRY AND PHYSICS.

CHEMICAL LECTURE CHARTS. By Geoffrey Martin. A Series of 36 Diagrams. *Low* - - - *Paper, Net* 42*s.*; *linen, Net* 63*s.*; *rollers, Net* 84*s.*

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QUALITATIVE CHEMICAL ANALYSIS. 8vo, pp. 250. By A. R. Bliss. *W. B. Saunders* - - - - - - *Net* 8*s.* 6*d.*

TEXT-BOOK OF PHYSIOLOGICAL CHEMISTRY. By Olaf Hammarstan and S. G. Hedin. 7th ed. 8vo. *Chapman & Hall* - - *Net* 17*s.*

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London County Asylum, Cane Hill, Coulsdon, Surrey. Res. Med. Supt., Sir J. M. Moody. Access—Coulsdon, S.E.R., or Coulsdon and Smitham Downs, L.B. & S.C.R., 10 minutes.

London County Asylum, Claybury, Woodford Bridge, Essex. Res. Med. Supt., Robert Armstrong-Jones, M.D. Access—Woodford Bridge station, G.E.R., 1½ miles.

London County Asylum, Colney Hatch, N. Res. Med. Supt., S. J. Gilfillan, M.A., M.B. Access—New Southgate, G.N.R.

London County Asylum, Hanwell. Res. Med. Supt., Dr. P. J. Baily.

London County Asylum, Horton Epsom. Res. Med. Supt., Dr. J. R. Lord. Access—L. & S.W. Ry., 1½ miles, L.B. & S.C.R., 1¾ miles.

London County Asylum, Long Grove, Epsom. Res. Med. Supt., D. Ogilvy, M.D. Access—L. & S.W.R. and L.B. & S.C.R.

London County Asylum, The Manor, Epsom. Res. Med. Supt., W. Ireland Donaldson, M.D. Access—L. & S.W. and L.B. & S.C.R.

London County Colony (for Insane Epileptics), Epsom. Res. Med. Supt., Dr. M. A. Collins. Access—L. & S.W. & L.B. & S.C.R. stations, 1½ miles.

Middlesex County Asylum, Tooting, S.W. Med. Supt., R. Worth, M.B., B.S. Access—Wandsworth Common station, 1 mile.

Moorcroft House, Hillingdon, Uxbridge, 2 miles. Med. Licensees, Dr. J. F. Stilwell and Dr. R. J. Stilwell. Access—West Drayton station, 2 miles.

Newlands House, Tooting Bec Common, S.W. Prop. and Res. Phys., Dr. J. Noel Sergeant. Access—Balham station, 1 mile, and motor bus.

Northumberland House, Green Lanes, N. Res. Med. Supt., Bernard Hart, M.D. Access—Finsbury Park station, 1 mile. *See also p.* 912

Otto House, 47, North End Road, West Kensington (for ladies). Lic. Prop., A. H. Sutherland. Lady Supt., Mrs. Chapman. Access—West Kensington station, 1 mile; Barons Court station (Piccadilly Tube), 1 mile. *See also p.* 918

Peckham House, 112, Peckham Road, S.E. Props., A. H. & H. G. Stocker. Res. Med. Supt., Dr. F. R. King. Access—Peckham Rye station, 10 minutes' walk. *See also p.* 915

St. Luke's Hospital, Old St., E.C. Res. Med. Supt., Wm. Rawes, M.D., F.R.C.S. Convenient to principal London stations. *See also p.* 915

The Grange, East Finchley, N. Res. Licensees, Dr. F. and Mrs. Watson.

The Priory, Roehampton, S.W., near Richmond Park. Res. Med. Supt., James Chambers, M.D. Access—Barnes station, 10 mins.

West Ham Boro' Asylum, Goodmayes, Ilford. Res. Med. Supt., Dr. L. F. Hanbury. Access—Goodmayes, ¾ mile.

Wood End House, Hayes (ladies). Uxbridge, 3 miles. Med. Lic., Dr. R. J. Stilwell. Access—Hayes station, 1 mile.

Londonderry.—*District Asylum*. Res. Med. Supt., Dr. Hetherington. Access—Londonderry, 1 mile.

Macclesfield.—*Parkside Asylum*. Res. Med. Supt., J. C. McConaghey, M.D. Access—Macclesfield, 1 mile.

Maidstone.—*Kent County Asylum*. Res. Med. Supt., H. W. Lewis, M.D. Access—Maidstone, 1½ miles.

West Malling Place, Kent. Res. Med. Supt., Dr. G. H. Adam. Access—Malling station, 1 mile.

Market Lavington (Wilts).—*Fiddington House*. Res. Med. Supt., J. R. Benson, F.R.C.S. Access—Lavington, G.W.R., 1 mile; Devizes, 6 miles. *See also p.* 915

Maryborough (Queen's County).—*District Asylum*. Res. Med. Supt., Dr. P. Coffey. Access—Maryborough, ½ mile.

Melrose, N.B.—*Roxburgh, Berwick, and Selkirk District Asylum*. Res. Med. Supt., J. C. Johnstone, M.D. Access—Melrose, 1 mile.

Melton.—*Suffolk District Asylum*, near Woodbridge. Res. Med. Supt., J. R. Whitwell, M.B. Access—Melton station, 1¼ miles; Woodbridge station, 2¼ miles.

Merstham (Surrey).—*Netherne County Asylum.* Med. Off., L. M. Webber, M.R.C.S.

Middlesbro'. — *County Boro' Asylum.* Res. Med. Supt., Dr. J. W. Geddes. Access—Middlesbro', 2 miles.

Monaghan (Ireland).—*District Asylum.* Res. Med. Supt., Dr. T. P. Conlon. Access—Monaghan, ¼ mile.

Montrose, N.B. — *Montrose Royal Lunatic Asylum.* Med. Supt., C. J. Shaw, M.D. Access—Hillside, ¼ mile; Dubton, 1 mile.

Morpeth. — *Northumberland County Asylum.* Res. Med. Supt., Thos. W. McDowall, M.D. Access—Morpeth station, 1 mile, by 'bus.

Mullingar. — *District Asylum.* Res. Med. Supt., Dr. Laurence Gavin. Access—Mullingar station, 1 mile.

Newcastle-on-Tyne.—*City Asylum.* Gosforth. Res. Med. Supt., James T. Callcott, M.D. Access—Newcastle, 4 miles.

Northampton. — *Berrywood Asylum.* Res. Med. Supt., W. Harding, M.D. Access—Castle station, 2½ miles; Midland station, 3 miles.

St. Andrew's Hospital, Northampton. Med. Supt., D. F. Rambaut, M.A., M.D. (T.C. Dub.) Access—Northampton station, 1 mile. *See also p.* 907

Norwich.—*Bethel Hospital for Mental Diseases.* Res. Med. Supt., S. J. Fielding, M.B. Cons. Phys., Saml. J. Barton, M.D. Access—Norwich (Thorpe) station, 1 mile. *See also p.* 913

Heigham Hall, Norwich. Res. Med. Prop., J. G. Gordon-Munn, M.D. Access—Victoria station, 1 mile; Thorpe station, 1½ miles.

Norfolk County Asylum, Thorpe, Norwich. Res. Med. Supt., D. G. Thomson, M.D. Access — Whitlingham, 1 mile; Norwich, 2½ miles.

Norwich City Asylum, Hellesdon, near Norwich. Res. Phys. and Supt., Dr. David Rice. Access—Hellesdon, 1 mile.

The Grove, Old Catton, near Norwich (for ladies). Res. Med. Supt., C. A. P. Osburne, F.R.C.S. Apply to the Misses McLintock.

Nottingham.—*City Asylum,* Mapperley Hill. Med. Supt., E. Powell, M.R.C.S.

Notts County Asylum. Res. Med. Supt., S. L. Jones, M.R.C.S. Access—Radcliffe-on-Trent, 2 miles.

The Coppice. Res. Med. Supt., David Hunter, M.B. (Camb.). Access—Midland station, 2½ miles; Gt. Northern & Gt. Central station, 1½ miles. *See also p.* 920

Omagh.—*District Asylum.* Res. Med. Supt., Dr. John Patrick. Access—Omagh station, 2 miles.

Oxford.—*County Asylum,* Littlemore. Res.Med.Supt.,T. S. Good,M.R.C.S. Access—Littlemore station.

The Warneford, Oxford, 1½ miles. Res. Med. Supt., Alex. W. Neill, M.D. Access—Oxford station, 2¼ miles. *See also p.* 919

Paisley. — *Lunatic Ward,* Poorhouse, Craw Road. Res. Med. Off., Winifred M. Ross, M.B., Ch.B. Access —Paisley, 1 mile.

Paisley District Asylum, Riccartsbar. Med. Off., D. Fraser, M.D. Access—Paisley West, ¼ mile.

Renfrew District Asylum, Dykebar, Paisley. Res. Med. Supt., R. D. Hotchkis, M.D.

Perth. — *District Asylum,* Murthly. Res. Med. Supt., Lewis C. Bruce, M.D. Access—Murthly.

James Murray's Royal Asylum, Perth (for private patients only). Phys. Supt., R. Dods Brown, M.D., F.R.C.P. Ed. Access—Perth station, under 2 miles. *See also p.* 917

Plympton.—*Plympton House,* Plympton, South Devon. Res. Props., Dr. Alfred Turner and Dr. J. C. Nixon. Access—Plympton, 1 mile; Marsh Mills, 2 miles; Plymouth, 5 miles. *See also p.* 918

Portsmouth. — *Borough Mental Hospital.* Res. Med. Supt., H. Devine, M.D., D.P.H. Access — Fratton, 1½ miles. *See also p.* 919

Prestwich (near Manchester).—*County Asylum.* Res. Med. Supt., Dr. F. Perceval. Acc.—Prestwich, ¾ mile.

Rainhill (nr. Liverpool).—*County Asylum.* Res. Med. Supt., T. P. Cowen, M.D. Access—St. Helens, 2½ miles; Rainhill, 1 mile.

Rotherham (Yorkshire).—*The Grange*, 5 miles from Sheffield (for ladies). Con. Phys., W. C. Clapham, M.D. Res. Phys., G. E. Mould, M.R.C.S., L.R.C.P. Access—Grange Lane station, G.C.R., ½ mile.

See also p. 919

St. Albans. — *Herts County Asylum*, Hill End. Med. Supt., A. N. Boycott, M.D. Access—Hill End station, G.N.R., 2 minutes.

Middlesex County Asylum, Napsbury, near St. Albans, Herts. Res. Med. Supt., L. W. Rolleston, M.B., B.S.

St. Leonards-on-Sea. — *Ashbrook Hall*, Hollington (for ladies). Res. Lics., Mr. and Mrs. Charles Somerset. Med. Off., Dr. Wm. E. Peck. Access—Warrior Square stat., 2 miles.

Salisbury.—*Fisherton House Asylum.* Med. Supt., Dr. R. T. Finch. Access—Salisbury station, 5 minutes.

See also p. 911

Laverstock House, Salisbury. Res. Med. Supt., E. C. Plummer. M.R.C.S. Access—Salisbury, 1½ miles.

Sevenoaks (Kent). — *Riverhead House* (for ladies). Res. Med. Supt., Dr. Wm. H. C. Macartney. Access—Sevenoaks station, S.E.R., ¾ mile.

Shrewsbury.—*Shropshire County Asylum.* Res. Med. Supt., W. S. Hughes, M.B., B.S. Access—Shrewsbury station, 2½ miles.

Sleaford.— *Kesteven County Asylum.* Med. Supt., J. A. Ewan, M.A., M.D. Access—Rauceby, G.N.R., ¼ mile.

Sligo.—*District Asylum.* Res. Med. Supt., Dr. Joseph Petit. Access—Sligo station, 1½ miles.

Stafford.— *County Mental Hospital.* Res. Med. Supt., Dr. J. W. S. Christie. Access—Stafford, 1 mile.

Coton Hill Mental Hospital, Stafford. Res. Med. Supt., R. W. Hewson, L.R.C.S. & P. (Edin.). Access—Stafford, 1 mile.

See also p. 920

Starcross (near Exeter).—*Western Counties Institution* (for mental defectives). Res. Supt., E. W. Locke. Access—Starcross.

Stirling. — *District Asylum*, Larbert. Med. Supt., Dr. R. B. Campbell. Access—Larbert, 1½ miles.

Stone (near Aylesbury).—*Bucks County Asylum.* Res. Med. Supt., H. Kerr, M.D. Access—Aylesbury station, 3¼ miles.

Talgarth.—*Brecon and Radnor Asylum.* Res. Med. Supt., R. Pugh, M.D.

Tamworth (Staffs.).—*The Moat House* (for ladies). Res. Licensees, Edward Hollins, M.A., and Mrs. S. A. Michaux. Access—Tamworth stat., ¾ mile.

See also p. 910

Taunton. — *Somerset & Bath Asylum*, Cotford, near Taunton. Res. Med. Supt., Dr. H. T. S. Aveline. Access—Norton Fitzwarren stat., 2 miles.

Ticehurst (Sussex).—*Ticehurst House.* Res. Med. Supt., Dr. H. Hayes Newington. Access—Wadhurst, 4 miles, or Ticehurst Road, 3 miles.

Tonbridge. — *Redlands.* Res. Med. Supt., W. A. Harmer, L.S.A. Access—Tonbridge junc., 2½ miles.

Virginia Water. — *Holloway Sanatorium*, Hospital for the Insane. St. Ann's Heath. Res. Med. Supt., W. D. Moore, M.D. Asst. Med. Offs., T. E. Harper, L.R.C.P., G.W. Smith, M.B., Emma M. Johnstone, L.R.C.P. & S., and C. Rutherford, M.B. Access—Virginia Water station, 5 minutes. Seaside Branch, *St. Ann's*, Canford Cliffs, Bournemouth. Med. Off., C. E. C. Williams, M.D.

See also p. 912

Wadsley (near Sheffield).—*South Yorkshire Asylum.* Res. Med. Supt., W. J. N. Vincent, M.D. Access—Wadsley Bridge, 1 mile.

Wakefield. — *West Riding Asylum.* Res. Med. Supt., J. Shaw Bolton, M.D. Access—Kirkgate and Westgate station, 1 mile.

Wallingford (Berks.).—*Berkshire Asylum.*—Res. Med. Supt., J. W. A. Murdoch, M.B. Access—Cholsey 1 mile.

Warlingham (Surrey).—*Croydon Mental Hospital.* Res. Med. Supt., E. S. Pasmore, M.D. Access — Upper Warlingham, 3¼ miles.

Warrington (Lancs.). — *County Asylum*, Winwick. Res. Med. Supt., A. Simpson, M.D.

Warwick. — *Midland Counties Institution*, Knowle (for feeble-minded children). Sec., A. H. Williams Med. Off., J. O. Hollick, M.B.

Waterford.—*District Asylum.* Res. Med. Supt., J. A. Oakshott, M.D. Access—G.S. & W.R., North station, 2 miles.

St. Patrick's Private Asylum, Belmont Park. Conducted by the Brothers of Charity. Med. Supt., W. R. Morris, M.B. Access—Waterford station, 1 mile.

Wells.—*Somerset and Bath Asylum,* Wells, Som. Res. Med. Supt., Dr. G. Stevens Pope. Access—Wells station, 1½ miles.

Whitchurch (Salop).—*St. Mary's House* (ladies only). Res. Med. Supt., C. H. Gwynn, M.D. Access—Whitchurch, 1 mile. *See also p.* 906

Whitefield (near Manchester).—*Overdale.* Res. Phys., P. G. Mould, M.R.C.S. Access—Prestwich and Whitefield station, 1½ miles.

Whittingham (near Preston).—*County Asylum.* Res. Med. Supt., Dr. J. F. Gemmel. Access—Whittingham station, 3 minutes.

Whittington (near Chesterfield).—*Whittington Hall* (Midland Counties Institution). Certified under the Mental Deficiency Act 1913, for 320 female patients. Med. Supt., Dr. A. M. Palmer. Access—Whittington station, ½ mile; Chesterfield, 5 miles.

Winchelsea (Sussex).—*Periteau,* near Hastings (for ladies). Res. Phys., Harvey Baird, M.D. Access—Winchelsea station, 1 mile.

Witham (Essex).—*The Retreat.* Licensees, Drs. Haynes & Greenwood Penny. Res. Med. Supt., Dr. R. A. Greenwood Penny. Access—Witham station, ½ mile.

Woking.—*Surrey County Asylum,* Brookwood. Res. Med. Supt., J. A. Lowry, M.D. Access—Brookwood station, 1¼ miles.

Worcester.—*County & City Lunatic Asylum,* Powick. Res. Med. Supt., Dr. G. M. P. Braine-Hartnell. Access—Worcester station, 4 miles.

York.—*The Pleasaunce* (ladies only). Phys. Supt. and Res. Licensee, L. D. H. Baugh, M.B. Access—York, 1½ miles. *See also p.* 916

The Retreat, York. Res. Med. Supt., Bedford Pierce, M.D., F.R.C.P. (Lond.). Access—York station, 1½ miles. Also *Throxenby Hall,* a branch house, near Scarborough. *See also p.* 912

Bootham Park Registered Hospital, York. Res. Med. Supt., G. R. Jeffrey, M.D. Access—York stat., 1 mile. *See also p.* 914

North Riding of Yorkshire Asylum, Clifton. Res. Med. Supt., A. I. Eades. Access—York, 2 miles.

York City Asylum, Fulford, York. Res. Med. Supt., Dr. C. L. Hopkins.

SANATORIA FOR CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

Aberchalder (N.B.).—*Inverness-shire Sanatorium.* Med. Supt., D. S. Johnston, M.D. Access—Aberchalder, 2 miles.

Aysgarth, S.O. (Yorks).—*Wensleydale Sanatorium.* Physicians, D. Dunbar, M.B., B.S., and W. N. Pickles, M.B., B.S. Access—Aysgarth, ½ mile, via Northallerton, N.E.R., and Hawes Junction, M.R. *See also p.* 888

Banchory (Scotland).—*Nordrach-on-Dee.* Res. Phys., D. Lawson, M.A., M.D. Access—Banchory station, 1½ miles.

Barrasford (Northumberland).—*The Newcastle-on-Tyne and Northumberland Sanatorium.* Res. Med. Supt., R. F. C. Talbot, M.D. Access—Barrasford, N.B.R., 4 miles.

Belbroughton (Worcs.).—*Bourne Castle Sanatorium.* Res. Phys., W. Bernard Knobel, M.D. Access—Hagley, G.W.R.

Benenden (Kent).—*Sanatorium* of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis." Two Res. Med. Officers. Apply, Secretary. Access—Biddenden station, 3 miles.

Bingley (Yorks.)—*Eldwick Sanatorium* (for women and children). Med. Off., Dr. Margaret S. Sharpe. Access—Bingley station, 2 miles.

Bolton (Lancs.).— *Wilkinson Sanatorium for Consumptives.* Med. Off., Dr. J. D. Marshall.

Bournemouth.—*Royal National Sanatorium for Consumption and Diseases of Chest.* Sec., A. G. A. Major. Res. Phys., Dr. A. W. Matthew. Access — Bournemouth station, 1 mile.

The Firs Home (for advanced cases). Hon. Sec., Colonel R. F. Anderson, Bournemouth. Hon. Med. Offs., C. P. Woodstock, M.D., and S. G. Champion, M.D. Lady Supt., Miss Ingram. Access—Bournemouth Central, ½ mile.

The Home Sanatorium, West Southbourne, near Bournemouth. Res. Med. Supt., J. E. Esslemont, M.B., Ch.B. Access—Bournemouth Central, 2½ miles; Boscombe, 1½ miles; Christchurch, 2½ miles.

See also p. 888

Bridge of Weir (Renfrewshire).—*Consumption Sanatoria of Scotland.* Hon. Treas., Sir Joseph Maclay, Bart., 21, Bothwell Street, Glasgow. Med. Supt., James Crocket, M.D. Access — Bridge of Weir, 2 miles.

Brighton. — *Municipal Sanatorium,* for Brighton townsfolk (early and advanced cases). Med. Supt., Dr. Duncan Forbes, M.O.H. for Brighton. Particulars, Town Hall, Brighton.

Chagford (Devon).—*Dartmoor Sanatorium.* Res. Med. Supt., Dr. C. H. Berry. Access — Moretonhampstead, G.W.R., 6 miles.

Cheddar (Somerset).—*Engel Home* (for females). Med. Supt., R. W. Statham, M.R.C.S. Apply to Lady Supt. Access — Cheddar station, 15 minutes.

Chelmsford (Essex). — *Great Baddow Sanatorium.* Med. Supt., A. Lyster, M.D. Access—Chelmsford station, G.E.R.

Cheltenham. — *Cranham Lodge Sanatorium,* near Stroud. Res. Med. Supt., A. H. Hoffmann, M.D.

Salterley Grange Sanatorium, near Cheltenham. Res. Med. Supt., Dr. A. K. Traill. Access—Leckhampton, 2½ miles.

Chesterfield (Derbyshire). — *Ashover Sanatorium.* Med. Supt., Dr. Ida E. Fox. Access—Stretton, M.R., 3½ miles.

Danbury (Essex).—*Alfred Boyd Memorial Sanatorium* (for ladies), Little Gibcracks, Essex. Med. Supt., A. Lyster, M.D.

Darlington.—*Felix House,* Middleton St. George, Co. Durham. Res. Med. Supt., C. S. Steavenson, M.B. Access—Dinsdale, N.E.R., 5 minutes.

Devon and Cornwall *Sanatorium,* Didworthy, South Brent. For consumptive poor of the two counties. Hon. Sec., S. Carlile Davis, Esq., Princess Chambers, Princess Sq., Plymouth. Res. Med. Supt., Dr. W. B. Livermore. Access—Brent, G.W.R., 2 miles.

Doneraile (Co. Cork).—*Cork County and City Sanatorium,* Heatherside. Res. Med. Supt., Dr. R. Ahern. Access—Buttevant, G.S. & W.R., 5 miles.

Dundee (near), *Sidlaw Sanatorium.* Med. Off., H. E. Fraser, M.D. Access—Auchterhouse station, 1½ miles.

Durham.—*Durham County Consumption Sanatoria.* Sec., Mr. F. Forrest, 54, John Street, Sunderland. For men: Stanhope, Med. Supt., Dr. John Gray. Access—Stanhope station, 1 mile. For women and children: Wolsingham, Med. Supt. Dr. Menzies. Access—Wolsingham station, ¾ mile.

Edinburgh.—*Royal Victoria Hospital for Consumption.* Under the Corporation of the City of Edinburgh, and the supervision of the Public Health Department.

Eversley (Hants). — *Moorcote Sanatorium.* Res. Med. Supt., J. G. Garson, M.D. Access—Wellington College station, 4½ miles; Wokingham station, 6 miles; Fleet, 6 miles.

Farnham (Surrey).—*Crooksbury Sanatorium.* Res. Phys., — —. Access—Farnham station, 3½ miles; Tongham, 2½ miles; Ash, 4 miles.

Whitmead Sanatorium, Tilford, near Farnham. Res. Phys., J. Hurd-Wood, M.D. Access—Farnham station, 3½ miles.

Fortbreda, Belfast.—*Forster Green Hospital for Consumption and Chest Diseases.* Res. Phys., Dr. W. J. F. Mayne. Sec., J. Osborne, Scottish Provident Building, Belfast. Access—Belfast, 2 miles.

Frimley (Surrey).—*Brompton Hospital Sanatorium.* Res. Med. Supt., Dr. W. O. Meek. Access — Frimley station, 2 miles.

Grange-over-Sands.—*Westmoreland Sanatorium.* Res. Med. Supt., C. F. Walker, M.D. Access—Grange-over-Sands station, 2¾ miles.

Hastings.—*Fairlight Sanatorium,* in connection with Margaret Street Hospital for Consumption and Diseases of the Chest (for Out-Patients), 26, Margaret St., W. Sec., Mabel C. Hawthorne. Med. Off., Dr. N. F. Stallard. Access—Hastings, tram, about 15 minutes.

Heswall (Cheshire).—*West Derby, Liverpool, and Toxteth Park Joint Sanatorium.* Med. Supt., J. B. Yeoman, M.D. Matron, Miss Bateson. Access—Heswall, 1½ miles.

Hull.—*Hull and East Riding Convalescent Home,* Withernsea. Sec., Benjamin Brooks, Royal Infirmary, Hull. Med. Off., A. E. Sproulle, L.R.C.P. Access—Withernsea stat.

Isle of Wight.—*Royal National Hospital for Consumption,* Ventnor. Senr. Res. Med. Off., Dr. Edgar Taunton. Sec., Charles W. Cox, 18, Buckingham Street, Strand, W.C. Access—Ventnor, 1 mile.

St. Catherine's Home, Ventnor (for advanced cases). Apply to the Sister-in-Charge. Med. Off., H. F. Bassano, M.A., M.B. Access—Ventnor, 5 mins. drive.

Kingussie, N.B.—*Grampian Sanatorium.* Res. Med. Supt., W. de Watteville, M.D.

Kinross-shire (Scotland).—*Ochil Hills Sanatorium,* Milnathort. Res. Med. Supt., Dr. Ian Struthers Stewart. Access—Kinross junction, 4 miles.

See also p. 892

Kirkcaldy.—*Sanatorium for Consumption.* Med. Supt., Dr. G. W. McIntosh. Sec., The Town Clerk. Access—Kirkcaldy, 1 mile.

Lanark.—*Bellefield Sanatorium.* Res. Med. Supt., Dr. J. W. Allan. Access—Lanark, 20 minutes.

Lanchester (Durham).—*Maiden Law Sanatorium.* Med. Off., Dr. W. M. Morison. Sec., W. H. Ritson. Access—Annfield Plain sta., 1 mile.

Leeds.—*Leeds Sanatorium for Consumptives,* Gateforth, near Selby, and *Leeds Hospital for Consumptives,* Armley. For poor of Leeds. Sec., C. H. Sedgwick, 37, Great George St., Leeds.

Liverpool.—*Liverpool Sanatorium for Consumptives,* Kingswood, Frodsham. Sec., Liverpool Hospital for Consumption, Mount Pleasant, Liverpool. Res. Phys., A. Adams, M.D. Access—Frodsham station, L. & N.W.R., 3½ miles.

Llanybyther (Carmarthenshire).—*West Wales Sanatorium.* The Welsh National Memorial to King Edward VII. Res. Med. Supt., Dr. H. O. Blanford. Access — Llanbyther station, 3 miles.

London.—*City of London Hospital for Diseases of Chest,* Victoria Park, E. Res. Med. Off., Dr. J. Ross Mac Neill. Sec., Geo. Watts. Access Cambridge Heath, G.E.R., 5 mins.

Mount Vernon Hospital for Consumption and Diseases of the Chest, Northwood. Access — Northwood (Met. & G.C. Rly.). Hon. Vis. and Res. Staff. Out-patient department, 7, Fitzroy Square, W. Secretary, W. J. Morton.

Royal Hospital for Diseases of the Chest, 231, City Road, E.C. Apply to the Secretary.

Long Stratton (Norfolk).—*Fritton Sanatorium.* Med. Director, Dr. Annie McCall, 165, Clapham Road, S.W. Access — Forncett station, G.E.R., 4 miles.

Manchester.—*Hospital for Consumption and Diseases of Throat and Chest,* Bowdon; *Crossley Sanatorium,* Delamere, Cheshire. (For poor and working classes, after personal examination at Manchester.) Sec., C. W. Hunt, Manchester. Res. Phys. (Bowdon), Dr. A. G. Bryce; (Delamere), G. Heathcote, L.R.C.P. & S.

Margate (Kent). — *Royal Sea-bathing Hospital* (for Surgical Tuberculosis). Sec., A. Nash, 13, Charing Cross, S.W. Access — Margate West, ¼ mile.

Mendip Hills. — *Mendip Hills Sanatorium*, Wells, Somerset. Res. Phys., D. J. Chowry Muthu, M.D. Access—Wells station, 2¾ miles.

See also p. 889

Nordrach-upon-Mendip, Blagdon, near Bristol. Res. Phys., R. Thurnam, M.D. Access—Burrington station, 5 miles.

Midhurst (Sussex). — *King Edward VII Sanatorium*. Res. Med. Supt., N. D. Bardswell, M.D. Access—Midhurst, 4 miles.

Nayland (Suffolk). — *East Anglian Sanatorium, and Maltings Farm Sanatorium* for poor men and women patients. Med. Supt., Dr. Jane Walker, 122, Harley Street, W. Access—Bures station, G.E.R., 3½ miles.

New Cumnock (Ayrshire). — *Ayrshire Sanatorium*, Glenaften. Res. Med. Supt., E. E. Prest, M.D. Access—New Cumnock, G.W.R., 3 miles.

Norfolk. — *Kelling Sanatorium*, Holt. Res. Med. Supt., Mr. J. I. W. Morris. Access—Holt station, 1½ miles.

Mundesley Sanatorium, Mundesley. Res. Phys., S. Vere Pearson, M.D. Access—Mundesley, 1 mile.

Northampton. — *Northamptonshire Sanatorium*, Creaton. Res. Med. Supt., Dr. J. A. Kilpatrick. Access—Brixworth, L. & N.W.R., 3 miles.

Nottingham. — *Ransom Sanatorium*, Sherwood Forest, Mansfield. Res. Med. Off., Dr. G. M. Dobrashian. Access—Mansfield, 3 miles.

Oban, Scotland.—*Argyll County Sanatorium*. Vis. Med. Off., Duncan MacDonald, M.D. Access—Oban, 1 mile.

Ockley (Surrey) *Sanatorium.*—Res. Phys., Dr Clara Hind. Access—Ockley, L.B. & S.C.R., 1 mile.

Painswick, near Stroud (Glos.).—*Painswick Sanatorium*. Res. Phys. and Prop., W. McCall, M.D. Access—Stroud, 4 miles; Gloucester, 6 miles.

Peebles.—*Manor Valley Sanatorium*. Med. Off., C. B. Gunn, M.D.

Penmaenmawr (N. Wales).—*Nordrach in Wales, Pendyffryn Hall*. Res. Phys., Dr. G. Magill Dobson.

Peppard Common (Oxon). — *Kingwood Sanatorium*, for ladies; *Maitland Sanatorium*, for working classes. Med. Supt., Dr. Esther Carling. Access—Reading, 6½ miles.

Ringwood (Hants). — *Linford Sanatorium*. Res. Phys., H. G. Felkin, M.D., A. de W. Snowden, M.D., and H. A. F. Wilson, M.R.C.S. Access—Ringwood station, 2½ miles.

Rudgwick (Sussex).—*Rudgwick Sanatorium*. Vis. London Phys., Dr. Annie McCall, 165, Clapham Road, S.W. Access—Rudgwick station, 5 minutes; Horsham stat., 7 miles.

Ruthin (N. Wales). — *Vale of Clwyd Sanatorium, Llanbedr Hall*. Res. Prop., Dr. G. A. Crace-Calvert. Access—Ruthin station, 2 miles.

See also p. 888

St. Leonards.—*Eversfield Chest Hospital*, West Hill. Res. Phys., T. Gambier, M.D. Access — West St. Leonards, S.E.R., West Marina, L.B. and S.C.R., within 5 minutes, walk.

Sandon, near Chelmsford (Essex). — *Merivale Sanatorium*. Res. Phys., H. N. Marrett, M.R.C.S. Access—Chelmsford station, G.E.R., 3½ miles.

Sheffield. — *City Hospitals for Consumptives*: Winter Street (for advanced male cases); Crimicar Lane (for males); Commonside (for females). Med. Supt., H. J. E. H. Williams, M.D.

Shirlett, near Broseley (Shropshire). — *King Edward VII Memorial Sanatorium*. Res. Med. Supt., Dr. F. H. Pearce. Access—Much Wenlock station, 3 miles.

Skipton (Yorks).—*Eastby Sanatorium* for males. Conducted by Bradford Board of Guardians. Med. Supt., B. H. Slater, F.R.C.S. Res. Med. Off,, Dr. C. Arnott. Access—Embsay station, 2 miles.

Stannington (Northumberland). — *Children's "Philipson" Sanatorium*. Matron, Miss S. M. Robson. Two Vis. Physicians. Access—Stannington station, 3 miles.

Threlkeld (Cumberland). — *Blencathra Sanatorium.* Res. Med. Supt., Dr. W. Goodchild. Access—Threlkeld, C.K. & P.R., 2 miles.

Torquay. — *Mildmay Consumption Home* for advanced cases (women) only. Hon. Med. Offs., F. D. Crowdy, M.D., and H. P. Wiggin, M.R.C.S. Hon. Sec., Miss Currie, "Smyrna," Torquay.

Western Hospital, Torquay. Open Oct. to May. Sec., F. Manley.

Warrenpoint (Co. Down). — *Rostrevor Sanatorium.* Res. Phys., B. H. Steede, M.D. Access—Warrenpoint. *See also p.* 889

Wicklow. — *The Royal National Hospital for Consumption for Ireland*, Newcastle, Wicklow. Res. Med. Off., Dr. Chas. D. Hanan. Access—D. & S.E.R. to Newcastle, Co. Wicklow, 3 miles.

Winsley, near Bath. — *Winsley Sanatorium.* For residents in the Counties of Bristol, Gloucester, Somerset, and Wilts. Res. Med. Off., Dr. H. T. Howell. Sec., Frederic Jones. Access—Limpley Stoke station, 1 mile.

Wokingham. — *Pinewood Sanatorium.* Res. Med. Supt., F. K. Etlinger, M.R.C.S. Access — Wellington College, S.E.R., 2 miles; or Wokingham, S.W.R., 3½ miles.

Worcester (near). — *Knightwick Sanatorium.* Res. Med. Supt., Dr. H. Gordon-Smith.

INSTITUTIONS FOR INEBRIATES.

Licensed under the Acts, 1879–1900.

The patient must sign a Form expressing a wish to enter the Home, before a magistrate. This can be done at the private residence of the patient, or at the retreat, if previous notice has been given. Two friends must also sign a declaration that they consider the patient an 'Inebriate' within the meaning of the Acts.

* Note:—Ashford is a Roman Catholic Religious Institution.

† Cinderford, Erdington, Herne Hill, Terrington St. Clement, and Torquay are C.E.T.S. Institutions.

Males Only.

Buntingford (Herts). — *Buntingford House Retreat.* Two Res. Physicians. Access — Buntingford, G.E.R., 8 minutes.

Cinderford† (Glos.). — *Abbotswood House Inebriate Retreat.* Chaplain Supt., Rev. S. Scobell-Lessey, M.D. Access—Ruspidge or Cinderford. *See also p.* 905

Cockermouth (Cumberland). — *Ghyllwoods.* Res. Med. Prop., Dr. J. W. Astley Cooper. Access—Cockermouth, 11 miles. *See also p.* 904

Colinsburgh (Fife). — *Invernith Lodge.* Res. Med. Supt. and Licensee, Dr. W.H.Bryce. Access—Kilconquhar station, 4½ miles. *See also p.* 903

Folkestone. — *Capel Lodge*, near Folkestone. Res. Prop., E. Norton, M.D. Access—Folkestone June., 2 miles. *See also p.* 906

Rickmansworth (Herts). — *Dalrymple House.* Apply to Res. Med. Supt. Access — Rickmansworth station, Great Central & Metropolitan Railway, ½ mile; L. & N.W.R., 1 mile. *See also p.* 904

Females Only.

Ashford, near Staines.* — *Ecclesfield.* Med. Supt., Dr. M. F. Cock. Apply, Mother Superior. Access—Ashford station, 1 mile. *See also p.* 905

Belfast. — *The Lodge Retreat*, Irwin Avenue, Strandtown. Med. Attendant, R. W. Leslie, M.D. Access—Bloomfield station, 5 minutes.

Beverley (E. Yorks). — *Albion House.* Res. Supt., the Matron. Hon. Sec., Mrs. T. R. Pentith, The Limes, Sutton-on-Hull.

Brighton. — *Park Gate*, Preston Road. Lady Supt., Sister Mary. Med. Off., R. J. Ryle, M.D., J.P. Access—Central station, ½ mile.

Erdington, near Birmingham.† — *Corngreaves Lodge.* Lady Supt., Miss Knapman. Med. Off., Dr. Featherstone. Access—Gravelly Hill station, ¼ mile. *See also p.* 905

Fallowfield.—*The Grove Retreat*, near Manchester, Licensee, Mrs. M. Hughes. Med. Offs., A. T. Wilkinson, M.D., J. W. Hamill, M.D., and Dr. Florence Robinson. Hon. Treas., S. Gamble. Access—Fallowfield station, 10 minutes.
See also p. 906

Herne Hill.†—*Ellison Lodge*, Half Moon Lane. Res. Supt., Miss Corner. Med. Supt., Dr. T. H. Underhill. Access—Herne Hill, 10 minutes; North Dulwich, 3 minutes. Telephone: 1162 Brixton.
See also p. 905

Leicester.—*Melbourne House*. Prop., Mr. H. M. Riley. Med. Attendant, R. Sevestre, M.A., M.D. Camb. London Consultant, W. Wynn Westcott, M.B. (Coroner N.E. London), 396, Camden Road, Holloway. Dublin Consultant, Sir Wm. J. Smyly, M.D., F.R.C.P.I., 58, Merrion Square, Dublin. Nat. Tel., 769 Leicester. Station, 2 miles.
See also p. 904

Newmains (N.B.).—*Newmains Retreat* for ladies. Access — Hartwood station, Cal. Railway, 2¼ miles.

Reigate (Surrey). — *Duxhurst*, for women of all classes. Under the Superintendence of Lady Henry Somerset. Med. Supt., A. Walters, M.R.C.S. Access—Reigate, 4 mls.
See also p. 905

Spelthorne St. Mary (Bedfont, Middlesex).—Apply to the Sister Superior, C.S.M.V. Access — Feltham, S.W.R., 1 mile.

Terrington St. Clement† (Norfolk). — *Hamond Lodge*. Res. Supt., Miss Yolland. Med. Supt., S. R. Lister, M.R.C.S. Access—Terrington station, 1½ miles.
See also p. 905

Torquay.† — *Temple Lodge*. Res. Supt., Sister in Charge. Med. Off., W. Odell, F.R.C.S. Hon. Sec., Mrs. H. Erskine.
See also p. 905

Wandsworth. — *Northlands Retreat*, 20, Bolingbroke Grove, Wandsworth Common, S.W. Apply, the Misses Round, and Sister Reeve. Access — Wandsworth Common station, L.B. & S.C.R.

REFORMATORIES CERTIFIED UNDER THE INEBRIATES ACT, 1898.

Male and Female.

Bristol.—*Brentry Certified Inebriate Reformatory*, Westbury-on-Trym. Res. Supt., Capt. Lay; Med. Off., Dr. Ormerod. Hon. Sec., Rev. H. N. Burden. Access—Clifton Down, Redland, or Patchway stat., 3½ mls.

Cattal (Yorkshire). — *Yorkshire Inebriate Reformatory*, Cattal, near York. For Yorkshire cases. Res. Supt. and Med. Off., Dr. F. P. Hearder. Access—Cattal, 1 mile.

Females Only.

Horley (Surrey).—*Farmfield*. For London cases, under Sec. II of the Act. Res. Supt., Miss Forsyth. Med. Off., Dr. C. F. Williamson. Access—Horley station, 2½ miles.

Langho (Lancashire). — *Lancashire Inebriate Reformatory*, Langho, near Blackburn. For Lancashire cases. Res. Supt. and Med. Off., Dr. F. A. Gill. Access—Langho station, 1½ miles.

UNLICENSED HOMES.

Beckenham (Kent). — *Norwood Sanatorium*, The Mansion, Beckenham Park. Med. Supt., F. Hare, M.D. Access—Beckenham Junc. station, 10 minutes.
See also p. 905

Dublin.—*Farnham House*, Finglas. Res. Med. Supt., H. P. D'Arcy Benson, M.D. Access—Dublin, 2 miles.
See also p. 921

Heybridge (Essex).—*Osea Island* (for ladies and gentlemen). Vis. Phys., H. I. Price, F.R.C.S. Prop., F. N. Charrington, Esq.

Hounslow (Middlesex.)—*West Holme*, for middle-class and working women. Med. Supt., Dr. G. A. S. Gordon. Access—S.W. & Dist. Rly., ¼ mile.

Liverpool.—*Temperance Home*, 318, Upper Parliament Street, for women. Supt., Miss A. J. Wilson. Med. Officer, C. E. Soloman, M.D. Access—Edge Hill station.

Port Stewart (Co. Derry).—*Ballyaughrin Sanatorium*. Med. Supt., Dr. J. Quin Donald.

HYDROPATHIC ESTABLISHMENTS.

Ben Rhydding (Yorkshire).—*Ben Rhydding Hydro.* Phys., Dr. F. J. Stansfield and Dr. W. R. Bates. Access—Station, a few hundred yards.

Bournemouth (Hampshire). — *Bournemouth Hydropathic.* Res. Phys., W. J. Smyth, M.D. Access—East station, 1½ miles; West station, ¼ mile.

Bristol. — *The Bristol Hydropathic* (formerly Bartholomew's Turkish Baths), College Green. Res. Phys., W. J. Spoor, M.B., M.R.C.S. Access—Temple Meads 1¼ miles. Tel. 1851. *See also p.* 899

Bute.— *Kyles of Bute Hydropathic,* Port Bannatyne, Rothesay. Man., A. Menzies. Med. Supt., Dr. A. J. Hall. Access—Clyde steamers call daily.

Buxton.—*Buxton Hydro Hotel.* Manager, G. W. Bosworth. Access—Station, 4 minutes.

Caterham (Surrey).—*Caterham Sanitarium and Surrey Hills Hydropathic.* Res. Med. Supt., A. B. Olsen, M.D. Access — Caterham station. *See also p.* 900

Clifton (near Bristol). — *Clifton Grand Spa and Hydropathic.* Access—Clifton Down station, 1 mile; Bristol station, 1½ miles.

Cork.—*St. Ann's Hill Hydropathic.* Access—Blarney station, 2½ miles; Muskerry Light Railway from Cork.

Crieff.—*Strathearn Hydro* (17 miles from Perth). Res. Med. Supt., T. Gordon Meikle, M.B., C.M. Access—Crieff station, 1 mile.

Eastbourne.—*Eastbourne Hydropathic.* Manager, W. J. Grimes. Access—Eastbourne station, 5 minutes' drive.

Edinburgh. — *Hydropathic,* Slateford. Man. Director, J. Bell. Access—Merchiston, 1 mile; Waverley, 3 miles.

Forres.—*Cluny Hill Hydropathic.* Vis. Phys., Dr. John Adam. Access—Forres station, 1 mile; Inverness, 24 miles.

Grange-over-Sands.—*Hazlewood Hydropathic.* Physicians, Richard Lowther, M.D., and Owen Gwatkin, M.R.C.S. Access—Carnforth, L. & N.W.R., then by Furness Railway; Grange-over-Sands, ¼ mile.

Harrogate (Yorkshire). — *The Cairn Hydropathic.* Man., Mrs. Baker. Access—Harrogate station, ½ mile.

Harlow Manor Hydro. Man., Miss Oakley.

The Harrogate Hydropathic Lim. Phys., Dr. T. Johnstone. Man., W. Taylor. Access—Harrogate station, ½ mile.

Harrogate Imperial Hydro. Man., Miss Hemingway.

Hexham (Northumberland).— *Tynedale Hydropathic.* Prop., F. G. Grant. Med. Supt., Dr. D. Stewart. Access—Hexham, 1 mile; Newcastle, 19 miles.

Ilfracombe.—*The Cliffe Hydro.* Med. Supt., Chas. W. E. Toller, M.D. Apply to the Secretary. Station, 1 mile.

Ilkley (Yorkshire). — *Craiglands Hydro., Lim.* Res. Physicians, Henry Dobson, M.D., C.M. (Edin.), and Maurice R. Dobson, M.B., B.S. (Lond.), L.R.C.P., M.R.C.S. (Eng.). *See also p.* 900

The Spa Hydro. Hotel, Ilkley. Manager, J. S. Brodie. Vis. Phys., Dr. T. B. Hearder. Access—Ilkley, 3 minutes.

Limpley Stoke (near Bath). — *West of England Hydropathic.* Access—Limpley Stoke station. Apply, the Secretary.

Malvern.—*The Malvern Hydropathic.* Res. Prop., J. C. Fergusson, M.D. Access—Great Malvern station, ¼ mile. *See also p.* 902

Wyche-side Hydropathic. Access—Malvern Wells station, G.W.R., ½ mile; Great Malvern station, 2 miles.

Matlock. — *Rockside Hydropathic,* Matlock. Med. Supts., Drs. Marie Goodwin (Resident) and Dr. Morton. Access—Matlock, ¾ mile. *See also p.* 894

Royal Hotel and Baths, Matlock Bath. Phys., W. C. Sharpe, M.D. Access—Matlock Bath station.

Smedley's Hydropathic, Matlock. Res. and Vis. Physicians. Access—Matlock station, ½ mile; omnibus.
See also p. 895

Moffat.—*The Moffat Hydropathic.* Man., Miss Gardner. Med. Supt., Dr. D. Huskie. Access—Moffat station, 1 mile.

Peebles.—*Peebles Hotel Hydropathic.* Complete modern equipment of baths and electrical treatment. Plombières treatment for mucous colitis. Fango di Battaglia (mud packs for sciatica, etc.). Res. Phys., Thomas D. Luke, M.D., F.R.C.S. Edin. Access—N.B. and Cal. stations about 10 to 15 mins. walk.
See also p. 893

Shandon.—*Shandon Hydropathic.* Consulting Phys., Dr. Wm. R. Sewell. Access—Shandon, 5 mins.

Southport (Birkdale Park).—*Smedley Hydropathic.* Phys., J. G. G. Corkhill, M.D. Southport or Birkdale stations.
See also p. 889

Kenworthy's Hydropathic, Southport. Res. Phys., Dr. Kenworthy. Access—Chapel Street (L. & Y.), Lord St. station (Cheshire Lines), ¼ mile. Tel. 80; Telegrams: Kenworthy's, Southport.
See also p. 889

Tunbridge Wells.—*The Spa.* Access—Station, about 1 mile; London, 34 miles. Apply, Manager.

Ulverston.—*Conishead Priory Hydropathic.* Visiting Physician, Dr. R. Ashburner. Access—Ulverston station, 1¾ miles.

NURSING INSTITUTIONS AND PRIVATE HOMES FOR INVALIDS.

NURSING INSTITUTIONS.

London.—*Co-operation of Temperance Male and Female Nurses*, 58, Weymouth Street, W. Secretary, M. Sullivan.
See also p. 882

Male Nurses' Association, 29, York Street, Baker Street, W. Sec., W. J. Hicks.
See also p. 883

Mental Nurses' Co-operation, 49, Norfolk Square, W. Lady Supt. Miss Jean Hastie.
See also p. 883

St. Luke's Hospital, Old Street, E.C. Trained Nurses for Mental and Nervous Cases. Apply Matron.
See also p. 883

Temperance Male Nurses' Co-operation, Ltd., 43, New Cavendish Street, W.; also at Manchester, Glasgow, and Dublin. Secretary, M. D. Gold.
See also p. xlii.

York.—*The Retreat* (Trained Nurses' Department, for mental and nervous cases only).
See also p. 912

PRIVATE HOMES FOR INVALIDS.

Alderley Edge (Cheshire).—*The David Lewis Colony* (for Sane Epileptics), and *Colthurst House School* (for epileptic boys). Director, Alan McDougall, M.D. Access—Warford, near Alderley Edge, Cheshire.
See also p. 881

Bath.—*Lansdown Hospital and Nursing Home*, Bath (invalids only; special arrangements for patients suffering from gout, rheumatism, and physical infirmities). Med. Supts., Dr. Percy Wilde and Dr. Wells-Beville. Access—M. or G.W. stations, 1 mile.
See also p. 884

Billericay (Essex).—*New Lodge*, and *Leon House.* For epilepsy and mental deficiency. Med. Off., W. Shackleton, M.D. Access—Billericay, 1 mile.
See also p. 881

Bristol.—*Sunshine House*, Brynland Avenue, Bishopston (for maternity cases only). Apply, Nurse.
See also p. 886

Church Stretton (Salop). — *Church Stretton Nursing Home*, "Ashford House." Apply, Misses Nicholls and Silverlock. *See also p.* 882

Edinburgh. — *Queensberry Lodge*, for ladies. Supt., A. Miller. Med. Supt., Dr. William Russell. Access—Waverley station, ½ mile. *See also p.* 886

Hadlow Down, Buxted (Sussex). — *South Beacon* (for the care and treatment of gentlemen mentally affected, but not ill enough to be certified). Prop., Philip H. Harmer. Access—Buxted, 3 miles; Mayfield, 4 miles; Heathfield, 4 miles. *See also p.* 882

Jedburgh. — *Abbey Green*. Res. Prop., Wm. Blair, M.D. Access—N.B.R., Jedburgh. Telephone No. 3. *See also p.* 886

Lancing-on-Sea. — *Southern Convalescent Homes and Sanatorium*. Sec., Mr. William Chorley, 6, Clephane Road, Canonbury, N. *See also p.* 887

London. — *St. Andrew's Hospital*, Dollis Hill, N.W. Res. Med. Supt., Mark C. Gardner, M.D. Access—Brondesbury, Metropolitan Railway station. Bus fare 1d. *See also p.* 885

St. Thomas's Home, St. Thomas's Hospital, Westminster Bridge. Apply, The Steward, St. Thomas's Hospital, S.E. Access—Waterloo, 5 minutes. Tel.: Hop. 1637. *See also p.* 887

New Brighton. — *Convalescent Home for Women and Children*. Hon. Sec. and Treas., Frank Holt, Esq., 8, Cook Street, Liverpool. Lady Supt., Miss K. R. Bolton. *See also p.* 887

Peebles, N.B. — *St. Ronan's* (for two or three mild mental cases). Med. Supt., Thomas D. Luke, M.D. Access—Peebles, ¼ mile. *See also p.* 892

Ryde, I.W. — *St. Luke's Home* for epileptic churchwomen, Ryde, I.W. Med. Supt., S. Churchill, M.A., M.B. *See also p.* 881

Tunbridge Wells. — *Mount Ephraim Nursing Home*, 8, Molyneux Park. Medical, surgical, Weir-Mitchell, and massage cases. Excellent facilities for open-air treatment. Apply, Miss Baxter. Access—S.E. & Chatham Station, 10 mins. *See also p.* 884

Westcliff-on-Sea. — *St. Ursula*, King's Road. Medical and rest Home. Apply, Miss Haslock. Access—Station, 15 mins. *See also p.* 884

PRINCIPAL BRITISH SPAS,

With Indications for their Therapeutical Employment.

Revised by N. Hay Forbes, F.R.C.S. Edin., F.R.S. Edin. (Church Stretton).

Bath (Somerset). — Sheltered from the N. and N.E. winds by a range of hills from 600 to 800 feet high; 2 hours from London (Paddington), 12 miles from Bristol. Rainfall, 28·6 inches in 1913, and sunshine, 1409 hours. Climate mild and equable.

Waters.—The only *hot* springs in Great Britain. Three springs yield over half a million gallons of water daily; the temperature of the hottest is 120° F. The waters contain sulphates of calcium, strontium, sodium, and potassium, with calcium carbonate, the chlorides of magnesium, sodium, and lithium.

Therapeutic indications.—Gout, chronic rheumatism, rheumatoid arthritis, sciatica, disorders of the digestive organs, anæmia, skin diseases, functional nervous disorders and debility.

Baths.—Modern baths of every description, including Aix douche massage, deep baths, electric, water and hot air, natural vapour, needle, intestinal douches for muco-membranous colitis and allied conditions, sulphur, Nauheim, and Zander medico-mechanical treatment.

Nursing and Baths.—Lansdown Grove House (*See p.* 884).

Bridge of Allan (Stirlingshire).— 422 miles from London, 3 miles north of Stirling. Sheltered from the north and east winds by the Ochil Hills. On the direct route to London, and within an hour's rail journey of Edinburgh and Glasgow. Average rainfall 33·24 inches. Climate mild and equable all the year.

Waters.—Natural mineral waters from six springs (Airthrey), at a depth of about 116 feet, exceedingly rich in saline, the chief ingredients being various salts of calcium, sodium, and magnesium. These waters are once more coming into great prominence.

Therapeutic indications.—Chronic affections of the liver, stomach, and bowels, in many chest diseases, and in rheumatism, gout, sciatica, and other nerve affections, also some diseases of the skin.

Baths.—Excellent suite of baths, with skilled attendants.

Buxton (Derbyshire) (*See also p.* 899).—1000 feet above sea level, 3½ hours from London (St. Pancras), 23 miles from Manchester, 30 from Sheffield, 53 from Liverpool. Bracing climate. Rainfall, 41·9 inches in 1913, and 1113 hours of sunshine. Lowest absolute humidity of any health resort in Great Britain.

Waters.—Thermal springs 82° F. Powerful radio-active properties. More highly charged with nitrogen gas than any other spring. Chalybeate spring.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, sciatica, nervous diseases, skin diseases, especially those of gouty origin, malaria and other tropical diseases, colitis, anæmia, phlebitis, and diseases of women.

Baths.—Over 70 different treatments. Every proved treatment installed. Recent official report of Devonshire Hospital gives percentage of cures as 88·6 per cent extending over last five years.

Boarding Establishment.—The Buckingham Boarding Establishment (*See p.* 899).

Cheltenham (Gloucestershire).—184 feet above sea level, 3 hours from London. Rainfall, 26·7 inches in 1913, and sunshine, 1270 hours. Town very free from fogs. Protected from N. and N.E. winds. Good water supply and modern sanitation.

Waters.—The mineral waters are of two kinds. One is alkaline from contained sodium carbonate, the other is impregnated with the sulphates of soda and magnesia. They are now receiving considerable attention from the medical profession, and seem likely to successfully compete with Carlsbad, Marienbad, and Vichy in attracting a portion of the patients formerly sent abroad.

Therapeutic indications.—Gout, dyspepsia, metabolic disorders generally, and neurasthenia.

Baths.—Good modern baths, with massage.

Church Stretton (Salop).— 613 feet above sea level, in the 'Highlands of England,' 4¼ hours from Euston, 3¾ hours from Paddington, 1½ hours from Birmingham, 2½ hours from Liverpool and Manchester, and 2½ hours from Bristol. Air noted for its extreme purity, bracing, with a somewhat tranquillizing influence, and a generally invigorating climate. Hills 1250 to 1700 feet high. Prevailing wind, S.W. Rainfall, 36·93 inches in 1913. Modern drainage. Porous soil.

Waters.—Said to be the purest in England; useful in gout, rheumatism, chronic renal affections, and arteriosclerosis.

Therapeutic indications.—Specially the 'open-air' cure of neurasthenia, for sequelæ of influenza, for insomnia, functional nervous diseases, chronic gout and rheumatism, chronic gastric and bronchial catarrh, debility from over-work, and convalescence after illness or operation. 'Terrain cure,' and special physical exercises for obesity, myocardial atony, early arteriosclerosis, hepatic inadequacy and constipation. A good 'after-cure' resort from Bath, Buxton, Cheltenham, Droitwich, Leamington, and Llandrindod Wells.

Nursing.—"Ashford House," Church Stretton Nursing Home (*See p.* 882).

Droitwich (Worcestershire) (*See also p.* 898).—150 feet above sea level, 2½ hours from London (Paddington), 19 miles from Birmingham, 6 from Worcester. Rainfall 23 inches. Mean winter temperature 47° F., summer 69·9° F. Well protected from N. and N.E. winds.

Waters.—The most powerful saline in the world. The brine is pumped from 200 feet below the ground level. Temperature 54° F., and is heated by introducing steam. It is 10 to 12 times as strong as that of the ocean (Channel), containing in every gallon 20,000 grains of saline in excess of any known waters: the waters possess radio-active properties.

Therapeutic indications.—Chronic muscular and articular rheumatism, rheumatoid arthritis, chronic articular or irregular gout, neuritis, sciatica, neuralgia, heart diseases, especially those of myocardium—effect similar and equal to Nauheim treatment—neurasthenia, anæmia, chlorosis, some sclerotic diseases of spinal cord, dry, scaly skin diseases, e.g., chronic eczema and psoriasis.

Baths.—Immersion, douche, needle, vapour, swimming, Aix-douche, Nauheim baths, etc.

Hotel.—Worcestershire Brine Baths Hotel, and Brine Baths (*See p.* 898).

Harrogate (Yorkshire). (*See also p.* 901).—450 feet above sea level, 4 hours from London, 18 miles from Leeds. The climate is stimulating and fairly dry—bracing moorland air. Rainfall in 1914, 31·22 inches, and sunshine, 1468 hours.

Waters.—Celebrated for the medicinal properties of its 87 springs—sulphurous, chalybeate, alkaline, and saline.

Therapeutic indications.—Anæmia, chlorosis, gout, rheumatism, disorders of liver and stomach, muco-membranous colitis, chronic appendicitis, and skin diseases.

Baths.—There are four establishments, where nearly 70 treatments are given, including sulphur baths, douche, Nauheim, vapour, Russian, Turkish, electric, mineral, electric light, ozone, throat and nasal (*See also p.* 901).

Ilkley (Yorkshire).—Situated on the southern slope of the valley of the Wharfe, rising rapidly from the bank of the river to a height of 1320 feet above sea level. Occupying a sheltered position. Annual rainfall, about 32 inches. Mean annual temperature 48° F. Death-rate 8 per 1000. Being close to extensive moors the air is bracing and exhilarating and at the same time dry and soft, having a wonderfully restorative effect upon invalids as well as on Anglo-Indians, delicate children, and convalescents.

Waters.—The water supply obtained from springs is remarkably pure, bright and sparkling. Chalybeate waters. Saline.

Therapeutic indications.—Gout, rheumatism, neuritis, neurasthenia, anæmia, asthma, and bronchitis cases are benefited. The treatment adopted is that known as hydro-therapeutic.

Baths.—Complete suites of baths are to be found in the numerous establishments. Electrical, Weir-Mitchell.

Hydropathic Establishment.—Craiglands Hydropathic (*See p.* 900).

Boarding Establishment.—Tarn House (*See p.* 900).

Leamington Spa (Warwickshire).—195 feet above sea level, 1 hour 30 minutes from London (Paddington or Euston), 24 miles from Birmingham. Equable and mild climate, with low rainfall. Westerly winds prevail.

Waters.—Saline, resembling those of Homburg, but more generally useful.

Therapeutic indications.—Muscular and articular rheumatism, gout, rheumatoid arthritis, neuralgia and neuritis, diseases arising from a plethoric condition of the chylopoietic viscera, eczema and other irritative disorders of the skin, conditions of increased vascular tension and chronic interstitial nephritis.

Baths.—Turkish, medicated, swimming, and electric of all kinds.

Llandrindod Wells (Radnorshire).—Situated in Central Wales, at an altitude of 750 feet. About 5 hours from London. It lies in the centre of a plateau of hills rising in places to over 2000 feet. Sheltered from the east, and open to the south and west. The soil is porous, and dries up quickly after rain. The climate is extremely bracing. Rainfall, 41·11 inches in 1913.

Waters.—There is a great variety of mineral waters—saline, sulphurous, iron, magnesium, chloride of calcium, and lithia springs similar in composition to those at Kissingen and Homburg. Slightly aperient and strongly diuretic.

Therapeutic indications.—The diseases most benefited are those in which any digestive derangements are present, the various forms of gout and rheumatism, rheumatoid arthritis, neuritis and fibrositis, gall-stones and biliary stasis, renal calculus, or any kidney or bladder condition requiring diuresis, and in neurasthenia, or debility from over-work or convalescence.

Hotel.—The Montpellier Hotel (*See p.* 897).

Llangammarch Wells (Breconshire).—In an open valley surrounded by moorland, 600 feet above sea level. 5¾ hours from London. Mean annual temperature 47·5° F., summer 55·4° F. Sunshine in 1913, 1212 hours, and rainfall 56·0 inches. Well protected from the east.

Water.—Saline, containing the chlorides of barium (6¾ grains per gallon), calcium, magnesium, lithium, and sodium; the only one of its kind in the British Isles. The barium salt has a physiological action on cardiac muscle similar to that of digitalis and strophanthus, and is also a good diuretic. Administered both internally and externally. Temperature 56° F.; is heated for bathing purposes. A modified Nauheim system of baths (immersion, douche, and needle), exercises, massage, and hill climbing is carried out.

Therapeutic indications.—Cardiac diseases, organic and inorganic, especially affections of the myocardium due to influenza. Graves's disease, chronic muscular and articular rheumatism, osteo-arthritis, gout, sciatica, and neurasthenia.

Malvern (Worcestershire).—Situated at an altitude of 520 feet above sea level, on eastern slope of Malvern Hills (9 miles long and rising to 1400 ft.), 2½ hours from London (Paddington), and about 1 hour from Birmingham. Original home of hydropathy. Soil gravelly (syenitic detritus). Air dry and bracing, cool in summer and warm in winter. Rainfall, 34 inches in 1913. Mean annual temperature 49·58 with low daily variation, daily mean of bright sunshine in 1913, 3·67 hours. Total sunshine in 1913, 1340 hours. Lowest death-rate of any inland watering-place. Sanitation perfect.

Waters.—Mainly spring, of remarkable purity, free from organic matter, less than 4 grains of earthy salts per gallon. W. & J. Burrow's Malvern Waters (*See p.* 958).

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, neuralgia, sciatica, lumbago, dyspepsia, constipation, anæmia, bronchial, nephritic, and cutaneous diseases.

Baths.—Natural pure brine (from Droitwich), Turkish and electric baths, Vichy massage and Aix douches, Fango-di-Battaglia.

Hydropathic Establishment.—The Malvern Hydropathic (*See p.* 902).

Matlock Bath (Derbyshire).—300 to 800 ft. above sea level, 3½ hours from London (St. Pancras), 46 miles from Manchester, 16 from Derby. Rainfall in 1913, 31·5 inches, and sunshine, 1059 hours. Very sheltered.

Waters.—Thermal Springs. Mild sulphated alkaline—saline waters at 68° F., containing 33 grains per gallon of salts, mainly magnesium and calcium bicarbonate, and magnesium sulphate. Owing to their peculiarly soft and unctuous character they are especially valuable in bathing and

douche operations, particularly those associated with massage, such as the 'Aix' and 'Vichy' douches.

Therapeutic indications.—Rheumatism, gout, rheumatoid arthritis, neuritis, neurasthenia, catarrhs (bronchial, gastric, or enteric), anæmia, cardiac asthenia, chronic diseases of the liver or kidneys, digestive and biliary disorders.

Baths.—A complete modern installation exists for the administration of all kinds of baths, douches, packs, and other hydropathic treatment, electricity, massage, inhalations, Nauheim baths, with Swedish exercises.

Fango-di-Battaglia.—The volcanic mineral deposit from the hot springs near Padua (N. Italy) is imported, and extensively used in the treatment of gout, rheumatoid arthritis, and neuritis.

Matlock Bank (*Matlock* station, one mile by rail from Matlock Bath).—300 to 800 feet above sea level, 3½ hours from London (St. Pancras), 45 miles from Manchester, 17 from Derby. South-westerly aspect, and well sheltered from the north. Climate mildly bracing. Sunshine above the average. The Matlock system of hydropathic treatment is carried out in all its branches, and the principal Hydros are installed with latest electric baths and appliances, including high-frequency, Dowsing radiant light and heat. Schnee four-cell, *x* rays, etc. They also include Turkish, Russian, plunge, medicated and inhalation baths, Aix and Vichy douches.

A feature of the Matlock Hydros is that, as a rule, they are complete in their own grounds, and contain croquet and tennis lawns, and bowling and putting greens, which, as a means of recreation and exercise, form a valuable auxiliary to a course of hydropathic treatment.

Hydropathic Establishments.—Rockside Hydropathic (*See p.* 894) and Smedley's Hydropathic (*See p.* 895).

Peebles (Peebleshire, N.B.).—500 ft. above sea level. One hour from Edinburgh and 8 from London (via Galashiels). Rainfall, 27 inches. Bracing climate, but sheltered from the north winds. Mean annual mortality rate 11 per mil. Population 6000 in winter, and 10,000 in summer.

Waters.—The waters are of the halothermal type, similar to Kissingen and Kreuznach. The chief ingredient is chloride of sodium. They are obtained from the famous St. Ronan's Well (6 miles east).

Therapeutic indications.—The waters are specially suited to the Nauheim and Bourbon Lancy treatment of cardiac disease, and in this respect seem likely to compete with the above-mentioned continental resorts, patients being saved the long journey, and also, after the baths, are conveyed by lift immediately to their rooms for resting. The waters are also suited to dyspepsia, gout, rheumatism and neurasthenia.

Baths.—The baths at the hydropathic are of the most modern type. Complete electrical installation and mud baths (Fango-di-Battaglia).

Hydropathic Establishment.—Peebles Hotel Hydropathic (*See* p. 893).

Ripon (Yorkshire) (*See also p.* 897).—Situated on rising ground near the junction of the Rivers Ure and Skell. On the N.E. Railway, 4¾ hours from London. 120 feet above sea level. Climate mild but bracing. Soil, gravel and sand, and dries quickly after rain. Prevailing winds, W. and S.W. Surrounding country well wooded and very beautiful, Fountains Abbey and many other places of interest are within easy reach. The Yorkshire Moors are only a few miles from the City.

Waters.—Saline Sulphur Water brought down from Aldfield Spa, 4 miles distant, to the New Baths erected in 1904.

Therapeutic indications.—Chronic and subacute gout and rheumatism, rheumatoid arthritis, skin diseases (eczema, psoriasis, acne), catarrhs, gastric and liver derangements.

The Baths have been lately equipped with up-to-date electric apparatus for electric treatments.

Strathpeffer Spa (Ross-shire, N.B.). — In the Highlands of Scotland. 180 to 300 feet above sea level. Through carriages twice a week during summer from London, 15 hours. Sheltered from N. and N.E. winds. Prevailing wind S.W. Sandy soil. Bracing air. Sunshine in 1913, 1121 hours, and rainfall, 25·6 inches.

Waters.—Sulphurous and chalybeate. Former, very rich in sulphuretted hydrogen gas and sulphates. Four sulphur wells in use: (1) Old well; (2) Upper; (3) Strong; (4) Cromartie. No. 4 contains over 19 cubic inches H_2S to gallon. Sulphates, the predominating salt. Have strong diuretic and mild aperient action.

Therapeutic indications.—Chronic and subacute gout and rheumatism (especially articular), rheumatoid arthritis, chronic skin diseases (eczema, acne, psoriasis), especially when gouty or rheumatic, chronic disorders of the digestive system, chronic gastric or intestinal catarrh, sluggish portal circulation, congested liver, biliary and urinary calculi, neurasthenia, anæmia, obesity, chronic metallic poisoning, dilatation of heart, neuritis.

Baths.—Sulphurous (immersion), inhalation, peat, douche (Aix and Vichy), needle, pine, Russian, Nauheim, radiant heat (electric), and high-frequency current.

Hotel.—The Ben Wyvis Hotel (*See p.* 896).

Trefriw Wells (Carnarvonshire). — A chalybeate spa in the Conway valley, one mile from Llanrwst station (L. & N.W.Ry.); 5 hours by rail from London. The climate is bracing, the air soft, pure, and mostly of a westerly or south-westerly type; it is recommended for the convalescent and the neurasthenic.

Waters.—Two varieties: (1) The aluminous chalybeate, and (2) the sulpho-magnesian chalybeate; the former contains 4·36 grains per ounce of crystalline ferrous sulphate, and the latter 1·95 grains per ounce of the same salt. Used internally, and externally in the form of baths.

Therapeutic Indications.—All those morbid conditions in which iron is indicated; conditions which, as a rule, mainly depend on some degenerative or destructive changes in the blood. For the so-called 'metabolic' diseases, which chiefly consist in some digestive inefficiency, some incomplete elimination of food-toxins and other various waste products, and some defective blood-formation. Useful in certain chronic skin diseases e.g., psoriasis, eczema, acne, and impetigo. Also suitable for the anæmia of 'granular kidney,' for some types of chronic catarrhal disease of mucous membranes, and for the usual forms of round-worm and tape-worm. The initial doses are small, usually from 2 or 3 teaspoonfuls to one or two tablespoonfuls gradually increased, being taken from first to last under medical supervision.

Tunbridge Wells (Kent). — 400 feet above sea level, 1 hour from London, 30 miles from Hastings. Rainfall in 1912, 38·2 inches, and daily mean of bright sunshine in 1912, 4·39 hours. Mean winter temperature 41·3° F., summer 55·9° F. Lies upon a bed of sandstone. Climate is tonic and invigorating. Prevailing winds W. and S.W.

Water.—Chalybeate spring, containing 4 grains ferrous carbonate to the gallon, with sulphates and chlorides of potash, soda, and calcium.

Therapeutic indications.—Diseases of respiratory organs (bronchitis, asthma, and phthisis), early cardiac cases, diseases of digestive organs, gout and rheumatoid arthritis, and especially diseases of nervous system (neurasthenia and mental depression), also in convalescence and infantile disorders. Waters indicated in anæmia, chlorosis, and allied conditions.

Baths.—Immersion, douche, needle, Turkish, Russian, vapour and swimming, medicated and electric light.

Nursing.—Mount Ephraim Nursing Home (*See p.* 884).

Hotel.—The Grand Hotel (*See p.* 900).

Woodhall Spa (Lincolnshire) (*See also p.* 902).—Built upon ironstone sand, through which the rain percolates very rapidly. Midway between Boston and Lincoln, about 3 hours from London (King's Cross). Average rainfall 22½ inches. Air bracing, and uncontaminated, from moors and pine woods. Excellent new water supply.

Waters.—Bromo-iodine waters, rich in the chlorides of sodium, calcium, and magnesium, with bromine and iodine.

Therapeutic indications.—Rheumatism (chronic articular and muscular), lumbago, arthritis deformans, gouty arthritis, sciatica, neuritis, paralysis, neurasthenia; injuries to joints; skin diseases, psoriasis, urticaria; diseases peculiar to women; diseases of throat and nose; liver disorders.

Baths.—Recently enlarged. Immersion, shower, undercurrent and local douches; Aix and Vichy douche massage; Nauheim, electric and Schnee baths; Dowsing radiant heat and light baths; nose, throat and eye mineral sprays and douches; Russian and Berthollet vapour; electric ionic and *x*-ray treatments; massage and Swedish exercises. Particulars, apply Medical Superintendent.

Hotel.—Victoria Hotel (*See p.* 902).

Helouan, Egypt.—Sixteen miles from Cairo by train, 200 feet above the Nile, which is about three miles from the town. Celebrated for its wonderfully dry and warm yet bracing climate, the amount of sunshine in the winter months, and its convenient position for seeing many of the antiquities of Egypt. The amount of bright sunshine from November to March averages 8·3 hours a day, as against 1·4 in London. The diurnal variations are small, the air is fresh by day and night and very free from dust. The average annual rainfall is about ¾ of an inch.

Waters.—Strong sulphur waters, which are used internally and externally in various ways, but especially in the Helouan Bath, in which massage is given while a stream of water at the desired temperature passes freely through the bath. This water rises at a temperature of 91° F.

Therapeutic indications.—Gout, rheumatism, the various forms of arthritis, fibrositis and neuritis, neurasthenia, chronic nephritis, and for those requiring a dry, warm climate, not relaxing, for the winter months.

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	Eastern Disp., Leman St.		Wednesday ; 11
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Medico-Psychological Association—Sec., 11, Chandos Street, W.
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New London Dermatological Society—Sec., 26, St. Paul's Road, Cannonbury, N.
Ophthalmological Society of the United Kingdom—1, Wimpole Street, W.
Pathological Society of Great Britain and Ireland—Sec., Guy's Hospital, S.E.
Pharmaceutical Society of Great Britain—17, Bloomsbury Square, W.C.
Physiological Society—Sec., University College, Gower Street, W.C.
Poor Law Medical Officers' Association—9, Copthall Avenue, E.C.
Psychical Research, Society for—20, Hanover Square, W.
Psycho-Medical Society—Sec., Dr. C. A. D. Bryan, 1, Saxe Coburg Street, Leicester.

Research Defence Society—Hon. Sec., 21, Ladbroke Square, W.
Röntgen Society—Hon. Sec., R. Knox, M.D., 7, Harley Street, W.
Royal Anthropological Institute—50, Great Russell Street, W.C.
Royal Astronomical Society—Burlington House, Piccadilly, W.
Royal Institute of Public Health—37, Russell Square, W.C.
Royal Institution of Great Britain—21, Albemarle Street, Piccadilly, W.
Royal Medical Benevolent Fund—11, Chandos Street, W.
Royal Meteorological Society—70, Victoria Street, S.W.
Royal Microscopical Society—20, Hanover Square, W.
Royal Sanitary Institute, with which is incorporated the Parkes Museum—90, Buckingham Palace Road, S.W.
Royal Society of London—Burlington House, Piccadilly, W.
Royal Society of Medicine—1, Wimpole Street, W., incorporated by Royal Charter, 1907, and embracing the following Sections :—Anæsthetical—Balneological and Climatological—Children's Diseases—Clinical—Dermatological — Electro Therapeutical — Epidemiological and State Medicine — Historical — Laryngological—Medical—Neurological—Obstetrical and Gynæcological — Odontological — Ophthalmological — Otological — Pathological—Psychiatry—Surgical (with sub-sections of Orthopædics and Proctology)—Therapeutical and Pharmacological.
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Society for the Study of Inebriety—Hon. Sec., 139, Harley Street, W.
Society of Medical Officers of Health—1, Upper Montague Street, Russell Square, W.C.
Society of Members of the Royal College of Surgeons of England—Sec., S. C. Lawrence, M.B., M.R.C.S., 22, Latymer Road, Lower Edmonton, N.
Society of Tropical Medicine and Hygiene—11, Chandos Street, W.
State Medical Service Association—Sec., 24, Wimpole Street, W.
Tuberculosis Society—Sec., 66, Upper Walthamstow Road, N.E.
United Services Medical Society—Royal Army Medical College, Grosvenor Road, S.W.
West London Medico-Chirurgical Society—West London Hospital, W.
Zoological Society of London—Outer Circle, Regent's Park, N.W.

MEDICAL AND SCIENTIFIC PERIODICALS, Etc.

Alchemical Society, Journal of the—Eight numbers yearly, 2/- net each—H. K. Lewis, 136, Gower Street, W.C.
Analyst—Monthly 2/-—Simpkin & Co., 2–8, Orange Street, Leicester Sq., W.C.
Anatomy and Physiology, Journal of—Quarterly 21/- per annum.—Chas. Griffin & Co., Lim., Exeter Street, W.C.
Annals of Surgery—Monthly 2/-—Cassell & Co. Lim., Ludgate Hill, E.C.
Bacteriology, Review of—Six times per annum for 10/6—36–38, Whitefriars Street, E.C.
Birmingham Medical Review—Monthly 1/-; 10/- per annum—Percival Jones, Lim., 148–149, Great Charles Street, Birmingham.
Brain—Quarterly 4/-—Macmillan & Co. Lim., St. Martin's Street, W.C.
Bristol Medico-Chirurgical Journal—Quarterly 1/6—Arrowsmith, Bristol.
British Medical Journal—Weekly 6d.—429, Strand, W.C.
Burdett's Hospitals and Charities—Yearly 10/6—28—29, Southampton Street, W.C.
Caledonian Medical Journal—Quarterly 1/—70, Mitchell Street, Glasgow.
Charing Cross Hospital Gazette—Quarterly 2/6 per annum—Charing Cross Hospital, Chandos Street, W.
Child, The—Monthly 2/-—Bale, 83–91, Great Titchfield Street, W.
Children's Diseases, British Journal of—Monthly 2/-—Adlard & Son, 23, Bartholomew Close, E.C.

Clinical Journal—Weekly 3d.—23, Bartholomew Close, E.C.
Dental Directory—Yearly 3/6—Bale, 83–91, Great Titchfield Street, W.
Dental Journal, British—1st and 15th, 6d.—19, Hanover Square, W.
Dental Record—Monthly, 7/6 per annum—17, Newman Street, W.
Dental Science, British Journal of—Monthly 6d., 14/– per annum—Bale, 83–91, Great Titchfield Street, W.
Dental Surgeon—Weekly 3d., 13/– per ann.—Baillière, 8, Henrietta St., W.C.
Dental Surgeon's Daily Diary and Appointment Book—Yearly 5/–, or 6/6—Bale, 83–91, Great Titchfield Street, W.
Dentists' Register—Yearly 3/4—Constable, 10, Orange Street, W.C.
Dermatology, British Journal of—Monthly 2/– net; 21/– per annum—H. K. Lewis, 136, Gower Street, W.C.
Dublin Journal of Medical Science—20/– per ann.—41, Grafton St., Dublin.
Edinburgh Medical Journal—Monthly 2/—W. Green & Son Lim., Edinburgh.
Glasgow Medical Journal—Monthly 2/—A. Macdougall, Mitchell St., Glasgow.
Guy's Hospital Gazette—Fortnightly 6d.; 7/6 per annum—Ash & Co. Lim., Henry Street, Bermondsey, S.E.
Guy's Hospital Reports—Yearly 10/6—7, Great Marlborough Street, W.
Heart: A Journal for the Study of the Circulation—Quarterly, 20/– per annum—Shaw & Sons, 7, Fetter Lane, E.C.
Homœopathic Journal, British—Monthly 1/—Bale, 83–91, Great Titchfield Street, W.
Homœopathic World—Monthly 6d.—12, Warwick Lane, E.C.
Hospital—Weekly 1d.; 6/6 per annum—28, 29, Southampton Street, W.C.
Hygiene, Journal of—Occasionally, 7/– each—Fetter Lane, E.C.
Indian Medical Gazette—Monthly 19/– per annum—Thacker & Co., 2, Creed Lane, E.C.
Inebriety, British Journal of—Quarterly 1/—Baillière, 8, Henrietta St., W.C.
Lancet—Weekly 6d.; 21/- per annum—423 Strand, W.C.
Laryngology, Rhinology, and Otology, Journal of—Monthly 2/–; 20/– per annum—Adlard & Son, 23, Bartholomew Close, E.C.
Laryngoscope, The—Monthly 24/– per ann.—Baillière, 8, Henrietta St., W.C.
Liverpool Medico-Chirurgical Journal—Half-yearly, 2/6 each—H. K. Lewis, 136, Gower Street, W.C.
London Hospital Gazette—6/– per annum—5, Rupert Street, E.
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Medical Magazine—Monthly 1/—44, Bedford Row, W.C.
Medical Officer—Weekly 4d.; 15/– per annum—36–38, Whitefriars Street, E.C.
Medical Press and Circular—Weekly 5d.; 21/– per annum—Baillière, 8, Henrietta Street, W.C.
Medical Register—Yearly 10/6—Constable, 10, Orange Street, W.C.
Medical Review—Monthly 1/6—70, Finsbury Pavement, E.C.
Medical Temperance Review—Quarterly 6d.—Adlard, Bartholomew Close, E.C.
Medical Times—Weekly 2d.—Basing House, Basinghall Street, E.C.
Medical World—Weekly 1d.—47, Fleet Street, E.C.
Medical and Dental Students' Register—Yearly, 2/6—Constable, 10, Orange Street, W.C.
Mental Science, Journal of—Quarterly 5/—7, Great Marlborough Street, W.
Microscopical Science, Quarterly Journal of—10/—J. & A. Churchill, 7, Great Marlborough Street, W.
Middlesex Hospital Journal—3/6 per annum—140, Wardour Street, W.
Midland Medical Journal—Monthly 4d.—Greswolde House, Birmingham.
Midwives' Roll—Yearly 10/6—Spottiswoode & Co., 5, New Street Sq., E.C.
National Dental Hospital Gazette—Monthly from Oct. to March, 3/– per annum—Bale, 83–91, Great Titchfield Street, W.
Neurology and Psychiatry, Review of—25/– per annum—20, South Frederick Street, Edinburgh.

New York Medical Journal—Weekly 6d.—66, West Broadway, New York.
New York Medical Record—Weekly 6d.—Wm. Wood & Co., 51, Fifth Avenue, New York.
Nurses' Own Magazine and Midwives' Record—Monthly, 2/- per annum—Baillière, 8, Henrietta Street, W.C.
Nursing Mirror and Midwives' Journal—Weekly, 1d.—28, 29, Southampton Street, W.C.
Nursing Times—Weekly 1d.—Macmillan & Co. Lim., St. Martin's St., W.C.
Obstetrics and Gynæcology of the British Empire, Journal of—Monthly 2/6—Sherratt & Hughes, 33, Soho Square, W.
Open-Air Schools and Children's Sanatoria, Year Book of—Yearly 7/6—Bale, 83–91, Great Titchfield Street, W.
Ophthalmic Hospital Reports, The Royal London—At intervals 7/6—J. & A. Churchill, 7, Great Marlborough Street, W.
Ophthalmic Review—Monthly 1/-—33, Soho Square, W.
Ophthalmological Society's Transactions—Yearly 12/6—J. & A. Churchill, 7, Great Marlborough Street, W.
Ophthalmoscope—Monthly 2/-—Pulman & Sons Lim., 24, Thayer Street, W.
Parasitology—Quarterly 30/- per annum—Cambridge University Press, Fetter Lane, E.C.
Pathology and Bacteriology, Journal of—Quarterly 21/- per annum—Pathological Laboratory, Museums, Cambridge.
Pharmaceutical Journal—Weekly 6d.—17, Bloomsbury Square, W.C.
Pharmacology and Experimental Therapeutics, Journal of—six times per annum for 21/-—Cambridge University Press, Fetter Lane, E.C.
Pharmacy, Year Book of—Yearly 10/-—7, Great Marlborough Street, W.
Physiology, Journal of—Occasionally, 21/- per volume—Fetter Lane, E.C.
Polyclinic—Monthly 6d.—Bale, 83–91, Great Titchfield Street, W.
Practitioner—Monthly 2/6; 25/- per annum—2, Howard Street, Strand, W.C.
Prescriber—Monthly 1/-; 10/- per annum—6, South Charlotte Street, Edinburgh.
Progressive Medicine—Quarterly 12/-—20 and 21, Bedford Street, W.C.
Psychology, British Journal of—Occasionally 15/-—Cambridge University Press, Fetter Lane, E.C.
Psychology (Abnormal), Journal of—Bi-monthly 16/- per annum—Baillière, 8, Henrietta Street, W.C.
Public Health—Monthly 1/6—1, Upper Montague Street, W.C.
Public Health, Journal of the Royal Institute of—Monthly 2/-—37, Russell Square, W.C.
Quarterly Journal of Medicine—Quarterly 8/6—Oxford University Press, Amen Corner, E.C.
R.A.M.C., Journal of the—Monthly 2/-—Bale, 83–91, Great Titchfield St., W.
Röntgen Ray, Archives of the—Monthly 1/8; 16/- per annum—20 and 21, Bedford Street, W.C.
Röntgen Society, Journal of the—Quarterly 4/-—Smith & Ebbs Lim., Northumberland Alley, Fenchurch Street, E.C.
Royal Dental Hospital Reports—Quarterly, 5/- per annum—Bale, 83–91 Great Titchfield Street, W.
Royal Sanitary Institute, Journal of the—Monthly 1/-—12, Long Acre, W.C.
Royal Society of Medicine, Proceedings of the—Seven times a year 7/6 each part—Longmans, Green & Co., 39, Paternoster Row, E.C.
Sanitary Record—Weekly 3d.; 14/- per ann.—55–56, Chancery Lane, W.C.
School Hygiene—Quarterly, 4/6 per ann.—Adlard, Bartholomew Close, E.C.
South African Medical Record—Fortnightly 1/-; 21/- per annum—Baillière, 8, Henrietta Street, W.C.
St. Bartholomew's Hospital Journal—Monthly 6d.—Students' Union, St. Bartholomew's Hospital, E.C.
St. George's Hospital Gazette—Monthly 6d.—83–91, Great Titchfield St., W.
St. Mary's Hospital Gazette—Monthly 5/- per annum—187, Edgware Rd., W.
St. Thomas's Hospital Reports—Yearly 8/6—7, Great Marlborough Street, W.

State Medicine, Journal of—Monthly, 2/—Bale, 83-91, Gt. Titchfield St., W.
Surgery, British Journal of—Quarterly, 7/6 net; 25/- per annum—John Wright & Sons Lim., Bristol.
Surgery, Gynæcology, and Obstetrics, and International Abstract of Surgery —Monthly, 5/-; 50/- per annum—Baillière, 8, Henrietta Street, W.C.
Tropical Diseases Bulletin—Fortnightly 1/6—Baillière, 8, Henrietta Street, W.C.
Tropical Life—Monthly 1/- —Bale, 83–91, Great Titchfield Street, W.
Tropical Medicine and Hygiene, Journal of—Fortnightly 1/-; 18/- per annum—Bale, 83–91, Great Titchfield Street, W.
Tropical Medicine and Hygiene, Transactions of the Society of—Eight numbers yearly, 3/6 net each—H. K. Lewis, 136, Gower Street, W.C.
Tropical Medicine and Hygiene, Year Book of—Yearly 7/6—Bale, 83–91, Great Titchfield Street, W.
Tropical Medicine and Parasitology, Annals of—Quarterly, 22/6 per annum—University Press, 57, Ashton Street, Liverpool.
Tuberculosis, British Journal of—Quarterly 1/6—Baillière, 8, Henrietta Street, W.C.
Tuberculosis Year Book and Sanatoria Annual—Yearly 7/6—Bale, 83–91, Great Titchfield Street, W.
Universal Medical Record—Monthly, 25/- per annum—36–38, Whitefriars Street, E.C.
University College Hospital Magazine—Six times during the year, 1/- —Bale, 83–91, Great Titchfield Street, W.
West London Medical Journal—Quarterly 1/- —23, Bartholomew Close, E.C.

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Cambridge University Press (C. F. Clay), Fetter Lane, E. C.
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Oxford Medical Publications (Henry Frowde and Hodder & Stoughton), Falcon Square, E.C.
Oxford University Press (Humphrey Milford), Amen Corner, E.C.
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Government Lymph Establishment, Colindale Avenue, The Hyde, N.W. Lymph is supplied, free of charge, to Public Vaccinators, on application to the Clerk

NOTE BOOK.

IT is easier to make a note of a thing than to remember *where* the note was made. The following pages are indexed under their respective headings, and any note can be immediately found when required.

NOTES.

Copy here any formula or fact you wish to keep for reference. (These pages are indexed under the word "Notes.")

THE INCIDENCE OF INCOME TAX

was rendered complicated by last Session's Finance Act, but it is now still more so by the Additional Burdens imposed in consequence of the War. It therefore behoves everyone to see that he is not taxed too highly, and to this end we call attention to the **INCOME TAX PROTECTION AND RELIEF ASSOCIATION, of 7 Staple Inn, Holborn, W.C.** (set forth in our Advertisement, page 878), which for **Half-a-Guinea a Year advises on all Income Tax matters, and fills up forms for its Subscribers.**

NOTES.

COLES' SPIRAL SPRING TRUSS.

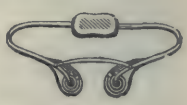
INVENTORS AND MAKERS—

WILLIAM COLES & CO. *Telephone:* Mayfair 2646

TRUSS SPECIALISTS,

5, Sackville Street, Piccadilly, LONDON, W.

(Late 225, Piccadilly, W.) *Particulars by post.*



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NOTES.

IRISH LINEN MESH BANDAGES. For Varicose Veins, Sprains, &c.

Hygienic, porous, absorbent, washable, durable. 2½ in. **2/-**; 3 in. **2/3**; 5 in. **7/6**. 3½ yards long, taped or supplied any length.

IRISH LINEN CATHETERS. Cylindrical **1/3**, Aboule **1/6**, Coudée **1/9**, bi-coudée **2/-**.

JOHN CLARKE & CO. (Successors) Ltd.,
DONEGALL SQUARE, W., BELFAST.

NURSES.

Note whether Midwifery or Sick Nurses, their terms and addresses.

GAUTIER FRÈRES' *ESTABLISHED* 1755.
FINE LIQUEUR BRANDY.
(20 *YEARS OLD.*) *See Advertisement, page lxxii.*

ADDRESSES (PRIVATE).

BISEDIA

An Elegant and Effective Preparation for GASTRO-INTESTINAL DISTURBANCE COMPLICATED WITH VOMITING.

See full announcement on page lx.

GILES, SCHACHT & CO., CLIFTON, BRISTOL.

HELICON

is the name for British-manufactured Acetylsalicylic Acid, both the drug and tablets being made in England. The German product is known as Aspirin. Helicon is guaranteed physiologically pure, and is extensively prescribed by doctors in private and hospital practice. *The Lancet* says it "conforms with the standards of purity laid down in the B.P. 1914," but as a matter of fact its purity is actually higher than that officially recognised in the B.P. Patriotic members of the medical profession should note that by prescribing Helicon they make absolutely certain their patients receive the British product, and are not by any possibility helping the German enemy.

Offer to Physicians of Sample Bottle

Helicon is obtainable through the usual channels in bottles of 25 and 100 5-gr. tablets, and also in 1 oz. and 8 oz. bottles in powder form for prescribing. Physicians' samples sent post free on application to the Castle Laboratory, London, N.W.

Back Volumes of the "Medical Annual" for the Years

1911 and 1912.

The Publishers will be glad to hear of any Copies which are for disposal, for the above years, if in good condition. They are frequently asked for Back Numbers to complete Sets, and their Stocks of the above are exhausted.

JOHN WRIGHT & SONS LTD., BRISTOL.

The Medical Defence Union

AND

INDEMNITY INSURANCE

£2000—ANNUAL COST—7s. 6d.

A special arrangement has been entered into with the Medical Defence Union whereby the Yorkshire Insurance Company undertakes to indemnify members of the Union against pecuniary loss in costs and damages through adverse verdicts in actions brought against them, and taken up by the Council, to the extent of £2000 for a premium of 7/6, or £2500 for a premium of 9/-

Further particulars will be immediately sent on application to any of the Company's Offices.

Points to be considered by Members of the Medical Defence Union.

(1) Members' subscriptions not increased, the Indemnity Insurance being *entirely voluntary.*

(2) Total annual cost for Subscription **and** £2000 Indemnity, 17/6, or for £2500 Indemnity, 19/-

(3) The indemnity is guaranteed independently of the Medical Defence Union by the above old-established Company, possessing accumulated funds of over *three millions sterling.*

. The . . **Established 1824.**

YORKSHIRE INSURANCE COMPANY LTD.

Funds Exceed FOUR MILLIONS

Chief Offices : St. Helen's Square, York. Bank Buildings, Princes Street, London, E.C.

The Company transacts the following classes of business on the most favourable terms :

FIRE. LIFE. ANNUITY. CASUALTY. TRUSTEE & EXECUTOR.
MOTOR CAR. LOSS OF PROFITS FOLLOWING FIRE.
EMPLOYERS' LIABILITY (Including Domestic Servants) BURGLARY.
PERSONAL ACCIDENT. SICKNESS. FIDELITY.
THIRD PARTY. PLATE GLASS. LIVE STOCK, Etc.

INDEX TO LIFE ASSURANCE OFFICES.

A, *when Established*; B, C, D, *Annual Premiums to Insure £100 on death, with Profits, at the age of 30, 40, and 50*; E, *Assurance and Annuity Funds, exclusive of Paid-up Capital.* M, *Mutual Offices*; P, *Proprietary Offices.*

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Title, Etc., of Office.	A	B	C	D	E
					£
Abstainers and General Insurance Co., Ltd., Edmund St., Birmingham. *Act. & Sec.*, R. A. Craig A.I.A. .. .. P	1883	40/11	55/10	82/3	703,764
Alliance Assurance Co. Ltd., Bartholomew Lane, E.C. *Gen. Man.*, Robert Lewis P	1824	48/9	64/5	90/9	*7,343,477
Atlas Assurance Co. Ltd., 92, Cheapside, E.C. *Act.*, William Penman. *Gen. Man.*, Saml. J. Fipkin .. .. P	1808	49/3	63/7	88/8	2,280,681
Australian Mutual Provident Society, Life, Endowments and Annuities, 37, Threadneedle Street, E.C., *Res. Sec.*, A. C. Hollingworth. **Further particulars see page 833** .. .. .. M	1849	48/2	64/5	89/10	32,000,000
Britannic Assurance Co. Ltd., Life, Endowment Assurances, House Purchase, Broad Street Corner, Birmingham. *Chairman*, F. T. Jefferson, J.P. *Secretary*, J. A. Jefferson, F.I.A. **Further particulars see page 832** .. .. P	1866	48/6	65/2	94/–	3,500,000
British Equitable Assurance Co. Ltd., 1, 2, 3, Queen Street Place, E.C. *Manager*, Basil May, F.I.A. .. .. .. P	1854	48/8	64/11	91/9	1,659,777
Caledonian Insurance Co., 19, George Street, Edinburgh. *Gen. Man.*, Robert Chapman. London Offices, 82, King William Street, E.C., and 14, Waterloo Place, S.W. P	1805	48/9	64/6	88/6	3,297,029
Canada Life Assurance Co., 15, King Street, Cheapside, E.C. *Man.*, A. D. Cheyne P	1847	48/9	65/10	96/8	10,750,000
Century Insurance Co. Ltd., 18, Charlotte Sq., Edinburgh. *Gen. Man.*, Hy. Brown. *Sec.*, John R. Little. London Office, 27, Queen Victoria St., E.C. *Man.*, S. G. Pasfield	1885	50/–	65/4	91/–	1,086,690
City Life Assurance Co. Ltd., 6, Paul Street, Finsbury, E.C. *Man. Director*, M. Gregory	1897	44/1	60/11	89/7	457,743
Clergy Mutual Assurance Society, Life, 2 & 3, Sanctuary, Westminster. *Act. and Man.*, F. B. Wyatt. *Sec.*, W. N. Neale. **Further particulars see page 831** M	1829	46/4	62/2	87/4	4,801,709
Clerical, Medical, and General Life Assurance Society, 15, St. James's Square, S.W., and 1, King William Street, E.C. *Gen. Man. & Act.*, A. D. Besant .. .. P	1824	48/7	66/9	96/3	6,001,136
Colonial Mutual Life Assurance Society Ltd., 33, Poultry, E.C. *Man.*, Arthur E. Gibbs. *Acting Assist. Man.*, E. A. Cawdron M	1873	47/4	63/2	89/9	3,650,000
Commercial Union Assurance Co. Ltd., 24, 25, and 26, Cornhill, E.C. *Act.*, A. G. Allen P	1861	47/10	65/2	92/4	5,598,662
Co-operative Insurance Society Ltd., 109, Corporation Street, Manchester. *Man.*, James Odgers. **Further particulars see page 834** .. .. .. P	1867	47/4	63/1	90/1	242,817
Eagle Insurance Co., 79, Pall Mall, S.W. *Man. & Act.*, F. B. Galer, B.A., F.I.A. *Sec.*, J. F. E. Hall .. .. P	1807	48/7	64/5	89/10	2,058,124
Edinburgh Life Assurance Co., 26, George Street, Edinburgh. *Man.*, T. M. Gardiner. *Sec. & Act.*, A. E. Sprague, D.Sc., F.F.A., F.I.A. London, 3, Birchin Lane, E.C. *Sec.*, J. J. Bisgood .. .. .. P	1823	47/11	64/2	90/2	4,327,689
English and Scottish Law Life Assurance Association, 33, St. James's Square, S.W. *Gen. Man.*, Albert G. Scott. *Act. & Sec.*, John Spencer, F.I.A. .. .. P	1839	47/1	62/8	87/9	3,127,824

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Title, Etc., of Office.	A	B	C	D	E
					£
Equitable Life Assurance Society, Mansion House Street, E.C. *Act. & Man.*, W. P. Elderton. .. .. .. M	1762	53/5	67/11	90/7	5,496,999
Equity and Law Life Assurance Society, 18, Lincoln's Inn Fields, W.C. *Act. & Sec.*, W. P. Phelps, M.A., F.I.A. .. P	1844	48/10	64/6	90/9	5,053,849
Friends' Provident Institution, Bradford, Yorkshire. *Sec.*, William H. Gregory. *Act.*, Alfd. Moorhouse, F.I.A. .. M	1832	48/–	64/–	89/7	3,380,661
General Accident Fire and Life Assurance Corporation Ltd., Perth, Scotland. *Gen. Man.*, F. Norie-Miller, J.P. .. P	1885	49/2	64/11	91/3	137,776
General Life Assurance Co., 103, Cannon Street, E.C. *Man. & Sec.*, John Robert Freeman. **Further particulars see page 832** .. .. P	1837	49/10	65/4	92/8	2,020,797
Gresham Life Assurance Society Ltd., St. Mildred's House, E.C. *Man. & Sec.*, Alexander Lawson. .. .. P	1848	48/2	64/1	91/5	10,345,293
Guardian Assurance Co. Ltd., 11, Lombard Street, E.C., and 21, Fleet Street. *Sec.*, T. G. C. Browne. *Act.*, Ernest Woods P	1821	48/10	64/6	89/3	4,502,924
Law Union and Rock Insurance Co. Ltd., Old Serjeants Inn, Chancery Lane. *Gen. Man.*, R. Stirling. .. .. P	1806	48/4	64/–	89/10	8,187,871
Legal & General Life Assurance Society, 10, Fleet St., E.C. *Act. & Man.*, E. Colquhoun P	1836	50/9	65/11	90/9	9,210,702
Life Association of Scotland, 82, Princes St., Edinburgh. *Man.*, Gordon Douglas. *Sec.* R. M. M. Roddick. London Office, 28, Bishopsgate, E.C. *Sec.*, J. C. Wardrop P	1838	48/11	64/10	91/1	6,005,898
Liverpool and London and Globe Insurance Co. Ltd., 1, Dale Street, Liverpool. *Gen. Man. & Sec.*, A. G. Dent. London Office, 1, Cornhill, E.C. .. .. P	1836	49/10	65/9	91/3	4,934,886
London and Lancashire Life and General Assurance Association Ltd., 66, 67, Cornhill, E.C. *Gen. Man.*, W. Æneas Mackay. *Sec.*, Louis I. Jarvis. *Jnt. Asst. Secs.*, E. E. Dent and L. C. Kestin. *Act.*, Harold Dougharty P	1862	48/9	64/9	91/2	3,807,136
London Assurance Corporation, 7, Royal Exchange, E.C. *Man.* of Life Dept., James Clunes. *Act.*, A. G. Hemming .. P	1720	49/–	64/8	90/2	2,640,187
London Life Association, Ltd., 81, King William Street, E.C. *Act. & Man.*, H. M. Trouncer, M.A, F.I.A. .. M	1806	47/–	61/8	85/4	5,419,372
Marine and General Mutual Life Assurance Society, 14, Leadenhall Street, E.C. *Act. & Sec.*, S. Day, F.I.A. .. M	1852	48/10	65/–	91/6	*1,978,497
Metropolitan Life Assurance Society, 13, Moorgate Street, E.C. *Sec.*, Bernard Woods. *Act.*, H. J. Baker, F.I.A. .. M	1835	49/9	66/4	92/–	2,382,921
Mutual Life and Citizens' Assurance Co. Ltd. (of Australia), Effingham Ho., 1, Arundel St. W.C. *Sec.*, Alex. S. Sellar, M.A., F.F.A. P	1886	48/9	65/3	89/9	8,670,283
Mutual Life Insurance Co. of New York, 7 & 8, Norfolk Street, Strand, W.C. *Gen. Man.*, J. H. Harrison Hogge. *Sec.*, T. Crawford M	1843	48/9	66/–	97/–	122,987,366
National Benefit Life and Property Assurance Co. Ltd., National House, Newgate Street, E.C. *Man.*, J. Francis, J.P., F.S.S. *Sec.*, S. F. Gandell .. .. .. M	1890	43/1	64/3	—	1,329
National Mutual Life Assurance Society, 39, King Street, Cheapside, E.C. *Act. & Man.*, Geoffrey Marks, F.I.A. *Sec.*, H. J. Lockwood. *Asst. Act.*, E. W. Townley, F.I.A. M	1830	48/4	63/7	89/6	3,097,003
National Mutual Life Association of Australasia, Ltd., 5, Cheapside, E.C. *Man.*, H. W. Meyers. **Further particulars see page 834** .. .. M	1869	46/8	61/6	87/2	8,500,000

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National Provident Institution, 48, Gracechurch Street, E.C. *Act. & Sec.*, L. F. Hovil .. .. .. M	1835	50/2	66/3	91/1	7,390,677
New York Life Insurance Co., Trafalgar Buildings, Trafalgar Square, London, W.C. *Gen. Man.*, E. H. Krause. *Sec.*, Wm. R. Collinson, F.C.I.S. .. .. M	1845	48/9	66/–	96/11	153,806,173
North British and Mercantile Insurance Co., 61, Threadneedle St., E.C., and 64, Princes St., Edinburgh. *Home Fire & Jt. Life Man.*, D. C. Haldeman. *Act.*, London, H. Lugton. *Sec.*, R. Carmichael .. P	1809	49/10	66/1	91/11	16,689,490
Northern Assurance Co. Ltd, 1, Moorgate Street, E.C. *Gen. Man.*, H. E. Wilson P	1836	49/–	64/8	90/10	5,374,169
Norwich Union Life Insurance Society, Norwich. *Gen. Man. & Act.*, Davidson Walker. London Office, 49, Fleet Street, E.C.	1808	45/8	59/6	85/3	12,617,584
Pearl Assurance Co. Ltd., High Holborn, W.C. *Jnt. Man'g Directors*, F. D. Bowles, J.P., C.C., and G. Shrubsall, J.P. P	1864	49/–	65/–	92/–	8,317,943
Phœnix Assurance Co. Ltd., 19 & 70, Lombard Street, 57, Charing Cross, and 187, Fleet Street, E.C. *Gen. Man.*, Sir Gerald H. Ryan, F.I.A. .. .. P	1782	48/11	64/7	90/8	11,429,866
Provident Clerks & General Mutual Life Assurance Association, 27 & 29, Moorgate Street, E.C. *Act. & Sec.*, C. R. V. Coutts .. .. .. M	1840	46/4	62/8	92/2	2,834,014
Prudential Assurance Co. Ltd., Holborn Bars. *Joint Secs.*, D. W. Stable and J. Smart. Further particulars see page 833 .. .. P	1848	49/6	65/11	91/11	*44,504,184
Refuge Assurance Co. Ltd., Oxford Street, Manchester. *Gen. Mans.*, J. Proctor Green and W. H. Aldcroft. London Office, 133, Strand, W.C. .. .. .. P	1864	49/3	65/9	91/9	9,762,853
Royal Exchange Assurance Corporation, Royal Exchange, E.C., and 44, Pall Mall, S.W. *Act.*, H. E. Nightingale, F.I.A. P	1720	49/–	64/9	90/2	4,594,572
Royal Insurance Co. Ltd., 1, North John St., Liverpool. *Man.*, G. Chappell. London Offices, 24–28, Lombard Street. *Sec.*, R. M'Connell .. .. .. P	1845	48/8	64/4	90/4	11,309,595
Sceptre Life Association Ltd., 40, Finsbury Pavement, E.C. *Sec.*, W. E. Wright P	1864	48/8	64/8	90/6	1,219,056
Scottish Amicable Life Assurance Society, St. Vincent Place, Glasgow. *Man.*, W. Hutton. *Sec.*, C. Guthrie .. M	1826	51/9	66/3	90/1	6,205,214
Scottish Equitable Life Assurance Society, 28, St. Andrew Square, Edinburgh. *Man. & Act.*, G. M. Low. *Sec.*, J. J. McLauchlan. London Office, 13, Cornhill, E.C. *Sec.*, P. W. Purves. .. .. M	1831	50/–	65/5	90/6	6,227,004
Scottish Life Assurance Co. Ltd., 19, St. Andrew Square, Edinburgh. *Man.*, Sir David Paulin, F.R.S.E. London Office, 9 & 10, King St., E.C. *Sec.*, L. Campbell P	1881	49/5	64/6	90/5	2,035,350
Scottish Provident Institution, 6, St. Andrew Square, Edinburgh. *Man.*, J. G. Watson. *Sec.*, R. T. Boothby. *Joint Asst. Secs.*, C. W. Thomson & Jas. C. Lindsay. *Act.*, W. G. Walton. London Offices, 3, Lombard St. E.C., and 17, Pall Mall, S.W. .. M	1837	42/4	56/6	83/2	15,700,550
Scottish Temperance Life & Accident Insurance Co., Ltd., 109, St. Vincent Street, Glasgow. *Manager*, Adam K. Rodger. London, 2, 3 & 4, Cheapside. *Man.*, W. A. Bowie. *Less 10 per cent to Whole Life Abstainers* .. .. .. P	1883	48/6	63/9	89/10	2,071,277

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Scottish Union & National Insurance Co., 35, St. Andrew Square, Edinburgh. *Gen. Man.*, J. A. Cook. London Office, 5, Walbrook, E.C. *Sec.*, James G. Nicoll .. P	1824	48/9	64/6	89/6	8,471,111
Scottish Widows' Fund Life Assurance Society, 9, St. Andrew Square, Edinburgh. *Man. & Act.*, G. J. Lidstone. *Sec.*, Geo. C. Stenhouse. London Offices, 28, Cornhill, E.C., and 5, Waterloo Place, S.W. *Sec.*, R. Maclure. .. .. .. M	1815	51/9	66/3	90/7	21,527,838
Standard Life Assurance Co., 3, George Street, Edinburgh. *Man.*, Leonard W. Dickson. London Offices, 83, King William St., and 3, Pall Mall East. *Sec.*, C. E. Fox P	1825	48/11	64/5	89/–	13,600,000
Star Assurance Society, 32, Moorgate Street, E.C. *Gen. Man.*, J. Douglas Watson. P	1843	49/9	66/3	93/8	7,022,258
Sun Life Assurance Society, 63, Threadneedle Street, E.C. *Act.*, R. G. Salmon, F.I.A. *Sec. & Gen. Man.*, E. Linnell P	1810	49/2	66/6	94/2	10,300,818
Sun Life Assurance Co. of Canada, Canada House, 4 & 5, Norfolk Street, W.C. *Man.*, J. F. Junkin .. .. P	1865	48/6	65/4	94/1	11,211,938
United Kingdom Provident Institution, 196, Strand, W.C. *Sec.*, H. W. Hasler M	1840	49/6	65/–	91/10	9,962,872
University Life Assurance Society, 25, Pall Mall, S.W. *Act. & Sec.*, R. Todhunter, M.A. .. .. P	1825	49/11	65/4	91/5	981,049
Wesleyan & General Assurance Society, Life, Annuities, Sickness, Assurance Buildings, Steelhouse Lane, Birmingham. *Gen. Man.*, A. L. Hunt. London Office, Halton House, 20–23, Holborn, E.C. Further particulars see page 832 .. M	1841	48/1	65/8	93/10	2,108,040
Yorkshire Insurance Co. Ltd., Chief Offices: St. Helen's Square, York. Bank Buildings, Princes Street, E.C. *London Branches*, 55, Pall Mall, S.W.; 49, Sloane Square, S.W.; 222-225, Strand, W.C.; 132, Newington Crescent, S.E., 43, Broadway, Stratford, S.E. Further particulars see page 826 .. .. .. P	1824	49/1	64/9	91/7	2,448,383

Medical Sickness and Accident Society, 300, High Holborn, W.C. *Sec.*, Bertram Sutton. Mutual. Established 1884. Assurance and Annuity Funds £260,000.

LIFE ASSURANCE or ANNUITIES

For Impartial and Reliable Advice

as to the most suitable Policy or combination of Policies for a particular purpose, and the Companies which issue such Policies on the most advantageous terms—

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ATTACHED TO NO INSURANCE COMPANY

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FOUNDED 1829. **Office: 2 & 3 THE SANCTUARY, S.W.**

Under the Society's Act of 1914,
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CLERGY and their Relatives,

are admissible to

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ALL PERSONS

Are eligible for "WITHOUT-PROFIT" Policies,

which are now issued at exceptionally low rates.

Owing to the fact that the Society
has **NO SHAREHOLDERS,**
employs **NO AGENTS,** and
pays **NO COMMISSION,**
all Policies, whether with or without Profits, are extremely favourable to the Holders.

General Life Assurance Co.

ESTABLISHED 1837.

FUNDS EXCEED - - - £2,000,000

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ROBERT HENRY SCOTT, Esq., F.R.S., D.Sc.

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FREDERICK TAYLOR, Esq., M.D., 20, Wimpole Street, W.
HERBERT FRENCH, Esq., M.D., 62, Wimpole Street, W.

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103, Cannon Street, London, E.C. **JOHN ROBERT FREEMAN,** *Manager & Secretary.*

Wesleyan & General Assurance Society

EMPOWERED BY SPECIAL ACT OF PARLIAMENT.

Established 1841. Incorporated 1914.

Chief Offices:

ASSURANCE BUILDINGS, STEELHOUSE LANE, BIRMINGHAM.

Branch Offices in all the Principal Towns, and Agencies throughout the Kingdom.

LONDON BRANCH OFFICE, HALTON HOUSE, 20-23, HOLBORN, E.C.
MANCHESTER ,, 9 & 10, CLARENCE CHMBRS., PICCADILLY
LIVERPOOL ,, .. LEITH BUILDINGS, 24, MOORFIELDS
GLASGOW ,, ... 134, ST. VINCENT STREET

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ANNUAL VALUATIONS & DISTRIBUTION OF PROFITS.

Copies of the Annual and Valuation Reports, Prospectuses with revised rates of Premiums, etc., may be had on application.

A. L. HUNT, General Manager.

Britannic Assurance Co. Ltd.

ORDINARY BRANCH:

Whole Life Assurances, with and without Profits.
Endowment Assurances, with and without Profits.
House Purchase, in combination with Life Assurance.

INDUSTRIAL BRANCH:

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Children's Assurances, Whole Life and Endowment.

Over £9,800,000 Paid in Claims.

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AUSTRALIAN MUTUAL PROVIDENT

Established **SOCIETY.** *1849.*

THE LARGEST MUTUAL LIFE OFFICE IN THE EMPIRE.

FUNDS - - - £32,000,000
ANNUAL INCOME - £4,000,000

MODERATE PREMIUMS.
LIBERAL CONDITIONS.
WORLD-WIDE POLICIES.
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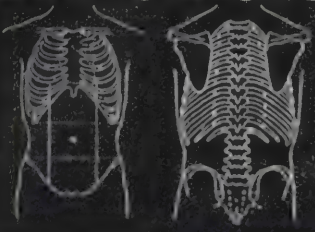

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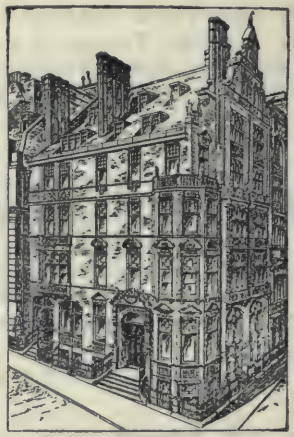

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THE MEDICAL SCHOOL is situated in the Paddington District of the West End of London, and, being in close proximity to five Railway Stations, is easy of access from all parts of the Metropolis and Suburbs. An official register of Students' rooms in the neighbourhood, and of private families who receive students as boarders, is kept in the office of the Medical School. The Athletic Clubs' Ground at Park Royal, Acton, is easily accessible from the Medical School.

Five Entrance Scholarships in Natural Science, value from £100 to £25 are awarded annually by Examination in September.

COURSES OF STUDY.

Instruction is provided in all subjects of the curriculum, under Recognised Teachers of the University of London, as follows:—

(*a*) **Preliminary Scientific.**—Complete Courses in Chemistry, Physics, and Biology. Students can join in January, April, or October.

(*b*) **Intermediate.**—Systematic Courses of Anatomy, Physiology, and Pharmacology, with Special Tutorial Classes for the 2nd M.B. London and Primary F.R.C.S.

(*c*) **Final.**—Systematic Lectures, Clinical Instruction, and Tutorial Classes in Medicine, Surgery, Obstetrics, and the various Special Departments. Full Laboratory Courses in General and Special Pathology; also in Bacteriology and Chemical Pathology, with especial reference to their clinical application.

CLINICAL PATHOLOGY AND OPSONIN DEPARTMENT.

Advanced Courses of Clinical Pathology and Bacteriology, under the direction of Sir Almroth Wright, F.R.S., are held throughout the year, and practical experience in Opsonic Investigation may be obtained in the Department of Therapeutic Inoculation.

RESIDENT MEDICAL OFFICERS.

Twenty are appointed Annually by Competitive Examination.

HOSPITAL STAFF.

Consulting Physicians—Dr. LEES, Dr. LUFF.
Consulting Surgeons—Mr. EDMUND OWEN, Mr. H. W. PAGE, Mr. A. J. PEPPER; (Ophthalmic) Sir G. A. CRITCHETT, Mr. H. E. JULER; (Skin) Sir MALCOLM MORRIS; (Dental) Mr. MORTON SMALE; (Throat) Dr. SCANES-SPICER; (Obstetric) Dr. M. HANDFIELD-JONES; Consulting Anæsthetist: Mr. HENRY DAVIS.
Physicians—Dr. S. PHILLIPS, Dr. WILFRED HARRIS, Sir JOHN BROADBENT, (Out-patients) Dr. W. H. WILLCOX, Dr. R. H. MILLER, Dr. F. S. LANGMEAD.
Surgeons—Mr. J. E. LANE; Mr. V. W. LOW; Mr. W. H. CLAYTON-GREENE; (Out-patients) Mr. MAYNARD SMITH, Mr. FITZWILLIAMS, Mr. V. Z. COPE, Mr. C. A. PANNETT
Obstetric Surgeons—Mr. T. G. STEVENS (Outpatients) Mr. A. W. BOURNE.
Ophthalmic Surgeon—Mr. LESLIE PATON. *Assistant Ophthalmic Surgeon*—Mr. G. COATS.
Surgeons to Ear, Nose and Throat Department—Dr. WM. HILL, Mr. C. I. GRAHAM.
Physician to Skin Department—Dr. GRAHAM LITTLE.
Physician to Department for Mental Diseases—Dr. R. H. COLE.
Dental Surgeon—Mr. W. H. DOLAMORE.
X-Ray Medical Officer—Dr. HARRISON ORTON.
Directors of Inoculation Department—Sir ALMROTH WRIGHT, F.R.S., Capt. S. R. DOUGLAS, I.M.S. (Assistant).

LECTURERS.

Clinical Medicine—Dr. PHILLIPS
Clinical Surgery—Mr. LANE
Medicine—Dr. HARRIS, Sir JOHN BROADBENT, Dr. WILLCOX
Surgery—Mr. LOW, Mr. CLAYTON-GREENE
Practical Surgery—Mr. MAYNARD SMITH, Mr. FITZWILLIAMS
Pathology—Sir ALMROTH WRIGHT, F.R.S. Dr. SPILSBURY, Dr. KETTLE (Asst.Lect.)
Bacteriology—Dr. FREEMAN Dr. FLEMING (Assist. Lecturer)
Pathological Chemistry—Dr. W. H. WILLCOX
Midwifery—Mr. STEVENS
Pharmacology—Dr. R. H. MILLER
Forensic Medicine—Dr. WILLCOX
Hygiene—Dr. WILLCOX
Mental Diseases—Dr. COLE
Neurology—Dr. HARRIS
Anatomy—Mr. J. ERNEST FRAZER
Physiology and Histology—Dr. H. E. ROAF
Biology—Dr. RIDEWOOD
Chemistry—Dr. P. HAAS
Physics—Mr. W. H. WHITE

For Calendar of the Medical School, giving full information as to Courses of Study, Fees, etc., apply to the Dean, Sir JOHN BROADBENT, or to Mr. B. E. MATTHEWS, School Sec.

UNIVERSITY OF DURHAM

COLLEGE OF MEDICINE, NEWCASTLE-ON-TYNE.

DEGREES IN MEDICINE, SURGERY AND HYGIENE; DIPLOMAS IN PUBLIC HEALTH AND PSYCHIATRY, AND LICENCE IN DENTAL SURGERY.—Six Degrees, two Diplomas, and one Licence are conferred by the University of Durham—*viz.*, the Degrees of Bachelor of Medicine, Doctor of Medicine, Bachelor of Surgery, and Master of Surgery; Bachelor of Hygiene, and Doctor of Hygiene; the Diplomas in Public Health and Psychiatry, and the Licence in Dental Surgery. These Degrees, etc., are open to Men and Women.

Attendance at the University of Durham College of Medicine during one of the five years of professional study, or subsequently to qualification elsewhere, is required as part of the curriculum for the Degrees, except in the case of Practitioners of more than fifteen years' standing, who, having attained the age of forty years, can obtain the Degree of M.D. after examination only.

The first three Examinations for the Degree of M.B. may be passed prior to the commencement of attendance at Newcastle.

A candidate who has passed the First and Second Examinations of the University will be exempt from the First and Second Examinations of the Conjoint Board in England, and will be entitled to present himself for the Final Examination of the Board on the completion of the necessary curriculum. Students who have satisfied the requirements of the General Medical Council as regards Registration, in some Examination other than the Durham Matriculation, or its equivalent, may enter on a course of study for a degree in Medicine upon satisfying the Examiners of the University of Durham in *three* of the subjects of the Matriculation Examination (exclusive of Religious Instruction and Elementary Mathematics), provided that one of them is a language other than English. In the case of a Student who spends only one year at Newcastle, the necessary subjects of the Matriculation Examination must be passed at least 12 months previously to the candidate's entry for his Final Examination for the Degree.

Students can complete, at the University of Durham College of Medicine, Newcastle-upon-Tyne, the entire course of professional study required for the above degrees and for the Diplomas in Public Health and Psychiatry; also for the examinations of the Royal Colleges of Physicians and Surgeons, and for the Army and Navy Examination Boards.

A Dental curriculum is provided, and a Licence in Dental Surgery may be obtained after Examination.

All information, together with Examination Papers, etc., is given in the Calendar of the University of Durham College of Medicine, Newcastle-on-Tyne, which may be obtained gratis from the Secretary at the College.

Scholarships, &c.—University of Durham Scholarship, value £100 for proficiency in Arts awarded annually to full students in their first year only. The Pears Scholarship value £150—for proficiency in Arts. Dickinson Scholarship—value the interest of £400, and a Gold Medal—for Medicine, Surgery, Midwifery, and Pathology. Tulloch Scholarship—value the interest of £400—for Anatomy, Biology, Chemistry, and Physics. Charlton Scholarship—value the interest of £700—for Medicine. Gibb Scholarship—value the interest of £500—for Pathology. Luke Armstrong Scholarship—interest on £680—for comparative Pathology. Stephen Scott Scholarship—interest on £1000—for promoting the study of Surgery and allied subjects. Heath Scholarship—the late George Yeoman Heath, M.D., M.B., D.C.L., F.R.C.S., President of the University of Durham College of Medicine, bequeathed the sum of £4000 to found a Scholarship in Surgery, the interest to be awarded every second year. Gibson Prize—value the interest of £225—for Midwifery and Diseases of Women and Children. The Turnbull Prize and Medal—for Surface Anatomy. The Outterson Wood Prize—value the interest of £250—for Psychological Medicine. The Goyder Memorial Scholarship (at the Infirmary)—value the interest of £325—for Clinical Medicine and Clinical Surgery. At the end of each Session, a Prize of Books is awarded in each of the regular Classes. Assistant Demonstrators of Anatomy, Prosectors, and Assistant Physiologists are elected yearly. Pathological Assistants, Assistants to the Dental Surgeon, Assistants in the Eye Department, Clinical Clerks and Dressers are appointed every three months.

The Royal Victoria Infirmary contains over 400 beds. Clinical Lectures are delivered by the Physicians and Surgeons in rotation. Pathological Demonstrations are given as opportunity offers, by the Pathologist; Practical Midwifery can be studied at the Newcastle Maternity Hospital, where there is an out-door practice of over 1000 cases annually.

FEES.

(*a*) A Composition Ticket for Lectures at the College may be obtained—

I.—By payment of 80 guineas on entrance.

II.—By payment of 50 guineas at the commencement of the First Year, and 40 guineas at the commencement of the Second Year.

III.—By three annual instalments of 40, 33, and 22 guineas respectively, at the commencement of the Sessional year.

(*b*) Fees for attendance on Hospital Practice:—

For 3 Months' Medical and Surgical Practice, £6 6s. For 6 months', £10 10s. For 1 year's, £15 15s. For Perpetual, £36 15s.

Or by two instalments—First year, 20 guineas; Second year, 18 guineas.

In addition to the above fees, the Committee of the Royal Victoria Infirmary require the payment of 2 guineas yearly up to three years from every Student attending the Infirmary for a year or part of a year. After three years of attendance, such payment will be no longer necessary.

(*c*) Single courses of Lectures, 5 guineas.

(*d*) A Composition Ticket for the courses of Lectures and Practical work of the first two years of the curriculum, may be obtained by the payment of 42 guineas on entrance.

(*e*) Composition fee for Lectures, etc., at College for Licence in Dental Surgery, 40 guineas; Composition fee for Practical work at Dental Hospital, 41 guineas.

(*f*) Composition fee for courses of instruction for the Diploma in Psychiatry, 25 guineas.

Fees for Lectures, etc., at the College and for Hospital Practice, must be paid to the Secretary; and fees for Practical Dental Work to the Dean of the Dental Hospital at the time of entry.

Further particulars may be obtained from the Sec., PROF. HOWDEN, at the College.

ROYAL INFIRMARY
EDINBURGH.

IN this Hospital (with 921 beds and 42 cots) Clinical Instruction is given by all the Physicians and Surgeons on the staff. Three wards are specially set apart for the instruction of Women Students. Special Instruction is given in the Medical Department on the Diseases of Women, Physical Diagnosis, and Diseases of the Skin; and in the Surgical Department on Diseases of the Eye, the Ear, and the Larynx, and in Dental Surgery. Separate Wards are devoted to Venereal Diseases, Diseases of Women, and Diseases of the Eye, the Ear and Throat, and the Skin; also to cases of Incidental Delirium or Insanity. Post-mortem Examinations are conducted in the Anatomical Theatre by the Pathologist, who also gives practical Instruction in Pathological Anatomy and Histology.

MEDICAL DEPARTMENT.

Consulting Physicians—SIR JAMES AFFLECK, DR. ALEXANDER JAMES, DR. BYROM BRAMWELL, EMER.-PROF. W. S. GREENFIELD, EMER.-PROF. JOHN WYLLIE.
Physicians—SIR THOMAS R. FRASER, Professor of Materia Medica, Edinburgh University; SIR R. W. PHILIP, Senior Lecturer in Clinical Medicine, Edinburgh University; DR. WILLIAM RUSSELL, Prof. of Clinical Medicine, Edinburgh University; DR. LOVELL GULLAND, Prof. of Medicine, Edinburgh University; DR. GRAHAM BROWN, DR. F. D. BOYD, DR. R. A. FLEMING, Senior Lecturers in Clinical Medicine, Edinburgh University; DR. HARRY RAINY.
Assistant Physicians—DR. CHALMERS WATSON, DR. EDWIN BRAMWELL, DR. EDWIN MATTHEW, DR. W. T. RITCHIE, DR. JOHN EASON, DR. JOHN D. COMRIE, DR. ALEX GOODALL, Lecturers in Clinical Medicine, Edinburgh University. One Vacancy.

SURGICAL DEPARTMENT.

Consulting Surgeons—MR. A. G. MILLER, DR. C. W. MACGILLIVRAY, EMER.-PROF. JOHN CHIENE, C.B., MR. J. M. COTTERILL.
Surgeons—MR. F. M. CAIRD, Regius Professor of Clinical Surgery, Edinburgh University; MR. C. W. CATHCART, MR. J. W. B. HODSDON, MR. DAVID WALLACE, Senior Lecturers in Clinical Surgery, Edinburgh University; MR. ALEXIS THOMSON, Professor of Systematic Surgery, Edinburgh University; MR. ALEXANDER MILES, Senior Lecturer in Clinical Surgery, Edinburgh University; MR. JOHN W. DOWDEN.
Assistant Surgeons—MR. A. A. SCOT SKIRVING, MR. GEORGE L. CHIENE, MR. W. J. STUART, MR. J. W. STRUTHERS, MR. HENRY WADE, MR. E. SCOTT CARMICHAEL, MR. D. P. D. WILKIE, MR. DENIS COTTERILL, Lecturers in Clinical Surgery, Edin. University. One Vacancy.

GYNÆCOLOGICAL DEPARTMENT.

Consulting Gynæcologists.—PROF. SIR HALLIDAY CROOM. EMERITUS-PROF. SIR A. R. SIMPSON.
Gynæcologists—DR. A. H. F. BARBOUR, MR. N. T. BREWIS, Lecturers in Clinical Gynæcology, Edin. University.
Assistant Gynæcologists—DR. J. HAIG FERGUSON, DR. WILLIAM FORDYCE, Lecturers in Clinical Gynæcology, Edinburgh University.

DEPARTMENT FOR DISEASES OF THE SKIN.

Consulting Physician—DR. W. ALLAN JAMIESON.
Physicians—DR. NORMAN WALKER, DR. FRED GARDINER, Lecturers in Dermatology.
Assistant Physician—DR. R. CRANSTON LOW.

OPHTHALMIC DEPARTMENT.

Consulting Surgeons—MR. GEORGE A. BERRY, DR. GEORGE MACKAY.
Surgeons—DR. W. G. SYM, DR. J. V. PATERSON, Lecturers in Ophthalmology.
Assistant Surgeons—DR. A. H. H. SINCLAIR, DR. H. M. TRAQUAIR.

EAR AND THROAT DEPARTMENT.

Consulting Surgeons—DR. P. M'BRIDE, DR. R. M'KENZIE JOHNSTON.
Surgeons—DR. A. LOGAN TURNER, DR. J. MALCOLM FARQUHARSON, Lectrs. in Ear & Throat Diseases
Assistant Surgeons—DR. JOHN S. FRASER, DR. JOHN D. LITHGOW.

DENTAL DEPARTMENT.

Consulting Surgeon—MR. WILLIAM GUY. **Surgeon**—MR. J. H. GIBBS.

ELECTRICAL DEPARTMENT.

Extra Medical Electrician *(for Radium Cases)*—DR. DAWSON TURNER.
Medical Electricians—DR. W. HOPE FOWLER, DR. ARCHIBALD M'KENDRICK.

PATHOLOGICAL DEPARTMENT.

Pathologist—PROFESSOR LORRAIN SMITH. **Clinical Pathologist**—DR. W. R. LOGAN.
Assistant Pathologists—DR. JAMES MILLER, DR. A. MURRAY DRENNAN, DR. D. MURRAY LYON.
Superintendent—LIEUT.-COL. SIR JOSEPH FAYRER, Bart., M.D., F.R.C.S.E.

HOSPITAL TICKETS.—Perpetual Ticket, in one payment, £12; Annual Ticket, £6 6s.; Six Months, £4 4s.; Three Months, £2 2s.; One Month, £1 1s. Separate payments, amounting to £12 12s., entitle the Student to a Perpetual Ticket on production of previous Season Tickets.

APPOINTMENTS.

No fees are charged for any Medical or Surgical Appointments in this Hospital, which are as follows:

1. Resident Physicians and Surgeons, who must be registered as legally qualified Practitioners, are from time to time appointed by the Managers on the recommendation of the Physicians and Surgeons. The holders of these offices live in the house free of charge. The appointment is for six months, but may be renewed at the end of that period by special recommendation
2. Non-Resident House Physicians and Surgeons and Clinical Assistants, who must also be registered as legally qualified Practitioners, are appointed by the Managers on the recommendation of the Physicians and Surgeons. The appointment is on the same terms as that of the Resident Physicians and Surgeons.
3. Clerks and Dressers are appointed by the Physicians and Surgeons. These appointments are open to all Students and Junior Practitioners holding Hospital Tickets.

Assistants in the Pathological Department are appointed by the Pathologist.

WILLIAM S. CAW, *Treasurer and Clerk.*

UNIVERSITY OF EDINBURGH.

SESSION 1914-15.

Principal—Sir WILLIAM TURNER, K.C.B., D.C.L., LL.D., D.Sc., M.B.

The SUMMER SESSION opens on 20th April and closes 2nd July.
The WINTER SESSION opens on 6th October and closes 17th March.

FACULTY OF MEDICINE.

Dean—Professor HARVEY LITTLEJOHN, M.A., B.Sc., M.B., C.M.

The Faculty embraces fifteen Chairs and twenty-seven Lectureships; and attached to these Chairs there are about thirty assistants and Demonstrators. Instruction is given in all the main branches of Medical Science, viz.,

PROFESSORS;

Chemistry—James Walker, D.Sc., F.R.S.
Zoology—J. Cossar Ewart, M.D.
Botany—Isaac Bayley Balfour, M.D., D.Sc.
Anatomy—Arthur Robinson, M.D., C.M.
Physiology—Sir E. A. Schäfer, LL.D.
Materia Medica—Sir Thomas R. Fraser, M.D. LL.D.
Pathology—J. Lorrain Smith, M.D.
Bacteriology—James Ritchie, M.A., M.D.
Forensic Medicine—Harvey Littlejohn, M.B., B.Sc.
Public Health—C. Hunter Stewart, M.B., D.Sc.
Medicine—John Wyllie, M.D., LL.D.
Surgery—Alexis Thomson, M.D., C.M., B.Sc.
Midwifery—Sir J. Halliday Croom, M.D.
Clinical Surgery—Francis Mitchell Caird, M.B., C.M.
Clinical Medicine—Sir Thomas R. Fraser, M.D. John Wyllie, M.D., Wm. Russell, M.D.

UNIVERSITY LECTURERS;

Clinical Surgery—Alexis Thomson, M.D., C.M., C. W. Cathcart, M.B., C.M., J. W. B. Hodsdon, M.D., David Wallace, C.M.G., M.B., C.M., Alexander Miles, M.D., C.M.
Clinical Medicine—Sir R. W. Philip, M.D., G. Lovell Gulland, M.D., J. J. Graham Brown, M.D., F. D. Boyd, C.M.G., M.D.
Clinical Gynæcology—A. H. F. Barbour, M.A., M.D., N. T. Brewis, M.B., C.M.
Systematic Gynæcology—A. H. F. Barbour, M.A., M.D.
Mental Diseases—George M. Robertson, M.D.
Diseases of the Eye—William G. Sym, M.D.
Clinical Instruction on Diseases of Children—John Thomson, M.D., and Staff of Royal Hospital for Sick Children.
Embryology and Vertebrate Zoology—J. Beard, D.Sc.
Anatomy—E. B. Jamieson, M.D.
Applied Anatomy—Harold J. Stiles, M.B., C.M.
Histology—Harold Pringle, M.D.
Physiological Chemistry—W. Cramer, Ph.D., D.Sc.
Experimental Physiology—J. Tait, M.D., D.Sc.
Physiology of the Nervous System—A. Ninian Bruce, M.D., B.Sc.
Experimental Pharmacology—W. C. Sillar, M.D., B.Sc.
Pathology, Practical—A. Murray Drennan, M.B., Ch.B.
Physics—C. G. Knott, M.A., D.Sc.
Diseases of the Larynx, Ear and Nose—A. Logan Turner, M.D.
Tropical Diseases—D. G. Marshall, Major I.M.S.
Medical Entomology, and Protozoology—J. H. Ashworth, D.Sc.
Tropical Hygiene—J. B. Young, M.B., D.Sc., conjointly with Professor.
Diseases of the Skin—Norman Walker, M.D., and Frederick Gardiner, M.D.
Clinical Instruction in Infectious Fevers—Alexander James, M.D.; Claude B. Ker, M.D.
History of Medicine—J. D. Comrie, M.A., B.Sc.
Neurology—J. J. Graham Brown, M.D. [M.D.
Physical Methods in the Treatment of Disease—Harry Rainy, M.A., M.D.
Surgical Pathology—J. M. Graham, M.B., Ch.B.
Practical Anæsthetics—D. C. A. McAllum, M.B., C.M., Demonstrator.

Practical Instruction is afforded, under the superintendence of the Professors, in Laboratories with the necessary appliances, and in Tutorial and Practical Classes connected with the above Chairs, and opportunities are afforded to Students and Graduates to extend their practical knowledge and engage in original research.

Opportunities for Hospital Practice are afforded at the Royal Infirmary, the Hospital for Sick Children, Maternity Hospital, the City Fever Hospital, and Asylum for the Insane. Upwards of 2,160 beds are available for the Clinical Instruction of Students of the University.

Four Degrees in Medicine and Surgery are conferred by the University of Edinburgh, viz., Bachelor of Medicine (M.B.), Bachelor of Surgery (Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.); and Diplomas in Special Branches of Medical and Surgical Practice may also be conferred on Graduates in Medicine and Surgery of the University.

The minimum Class Fees for M.B. and Ch.B., including Hospital Fee (£12), amount to about £130, and the Matriculation and Examination Fees to £28 7s. An additional Fee of £15 15s. is payable by those who proceed to M.D., and £15 15s. by those who proceed to Ch.M.

The Annual value of the Bursaries, Prizes, Scholarships, and Fellowships in the Faculty of Medicine amounts to about £3,600, and that of the other Bursaries, etc., tenable by students of Medicine, amounts to about £1,820.

Instruction is also given in Public Health, and the Degrees of B.Sc. and D.Sc. in Public Health are conferred by the University.

Residences for Students, Graduates and others, situated within easy reach of the University, afford excellent board and lodgings on very moderate terms.

A Syllabus and further information as to Matriculation, the Curricula of Study for Degrees, etc., may be obtained from the Dean of the Faculty of Medicine, and for Degrees in the Faculties of Arts, Science, Divinity, Law and Music, from the Deans of these Faculties; or from the Clerk of Senatus; and full details are given in the University Calendar, published by James Thin, 55, South Bridge, Edinburgh. Price by post, 3s. 6d.

The Preliminary and Degree Examination Papers in each of the Faculties are also published by Mr. James Thin -viz., Arts and Science Preliminary Papers and Bursary Papers, 1s.; Medical Preliminary Papers, 6d. Degree Papers—Arts, 1s.; Science, 9d.; Divinity, Law, Medicine, and Music, 6d. each.

By Authority of the Senatus,

July, 1914. L. J. GRANT, *Secretary of Senatus.*

UNIVERSITY of BRISTOL.

FACULTY OF MEDICINE.

THE University affords complete courses of instruction for its own examinations, those of the University of London, and those of the Conjoint Board, etc., for Medical Degrees or Diplomas. The Dental and Public Health Departments afford the necessary instruction for the Degrees and Diplomas of the University and of other examining bodies in those subjects.

The University confers the following Degrees and Diplomas :—

Bachelor of Medicine and Bachelor of Surgery	M.B., Ch.B
Master of Surgery	Ch.M.
Doctor of Medicine	M.D.
Bachelor of Dental Surgery	B.D.S.
Master of Dental Surgery	M.D.S.
Diploma in Dental Surgery	L.D.S.
Diploma in Public Health	D.P.H.

The early part of the curriculum so interlocks with the curriculum for the B.Sc. that the Medical student may without much loss of time take also the degree of B.Sc. Moreover, the Dental student may in seven years take both Dental and Medical degrees. The whole of the Dental Mechanical work for the Bristol Royal Infirmary and the Bristol General Hospital is done in the University laboratory by the students, instructed by a skilled mechanic.

CLINICAL WORK is done at the Bristol Royal Infirmary, and the Bristol General Hospital, which together contain over 550 beds. The Bristol Royal Hospital for Sick Children and Women, the Bristol Eye Hospital, the Bristol City and County Asylum, and the Bristol City Fever Hospital are also open for the clinical instruction of students.

SCHOLARSHIPS.—There is no entrance scholarship, but students from the City of Bristol may, on their merits, receive financial aid from the City Scholarship Fund on application to the City Scholarship Committee.

Several Scholarships and Prizes are open to students during their Hospital career.

HOSPITAL APPOINTMENTS open to students after qualification.

At the Bristol Royal Infirmary.—Two House Surgeons, two House Physicians (of these one is chosen as Senior Resident Officer), one Resident Obstetric Officer, one Throat, Nose and Ear House Surgeon, one Ophthalmic House Surgeon, one Casualty Officer, and one Dental House Surgeon.

At the Bristol General Hospital.—One Senior House Surgeon, one Casualty House Surgeon, two House Physicians, one House Surgeon, and one Dental House Surgeon. All these appointments are salaried, with board and residence.

For further particulars and prospectus apply to the Dean of the Faculty of Medicine, or to the Registrar.

GLASGOW Royal INFIRMARY.

THE WINTER SESSION opened on October 12, 1914. Number of Beds, including the Ophthalmic Department, is about 700.

Special Wards and Beds are set apart for the treatment of Diseases of Women, of the Throat and Nose, of the Ear, of the Skin, and of Venereal Diseases. Advice is given at the Dispensary on Diseases of the Skin and of the Teeth, and there is a special department for the treatment of Diseases and Injuries of the Eye. There is a fully equipped Electric Pavilion. Women Students are admitted to the Clinical Teaching and Practice of the Infirmary.

Honorary Consulting Physicians—ROBERT PERRY, M.D., Sir DONALD C. M'VAIL, M.B., GEORGE S. MIDDLETON, M.D., ALEX. MORTON, M.D.

Honorary Consulting Surgeons—DAVID W. KNOX, M.B., JOHN BARLOW, M.D., DAVID NEWMAN, M.D.

Physicians—Dr. W. K. HUNTER, Dr. JOHN M. COWAN, Dr. J. MACKENZIE, Dr. WM. R. JACK, and Dr. JOHN HENDERSON.

Surgeons—Mr. JAMES S. ADAMS, Mr. J. H. PRINGLE, Mr. HENRY RUTHERFURD, Mr. PETER PATERSON, Mr. ROBERT KENNEDY, Mr. A. N. MCGREGOR, and Mr. THOMAS KAY.

Assist. Physicians—Dr. JAMES SCOTT, Dr. A. W. HARRINGTON, and Dr. WM. WATSON.

Assistant Surgeons—Mr. JOHN PATRICK, Mr. JOHN A. C. MACEWEN.

Dispensary Physicians—Dr. D. H. MACPHAIL, Dr. ARTHUR M. CRAWFORD, Dr. DAVID MACDONALD, Dr. JOHN C. MIDDLETON, and Dr. A. M. KENNEDY.

Dispensary Surgeons—Mr. A. G. FAULDS, Mr. JAMES BATTERSBY, Mr. DONALD DUFF, Mr. ALEX. J. COUPER, Mr. MILNE MCINTYRE, and Mr. R. S. DEWAR.

Extra Dispensary Phys.—Dr. AGNES PICKEN, Dr. T. S. BARRIE, Dr. D. T. C. FREW, and Dr. WM. WATSON.

Extra Dispensary Surgeons—Mr. WILLIAM C. MACKIE, Mr. J. A. G. BURTON, Mr. P. H. ROBERTSON and Mr. JAMES TAYLOR.

Gynæcologists—Dr. G. BALFOUR MARSHALL and Dr. J. MUNRO KERR.

Diseases of the Ear—Dr. J. KERR LOVE.

Diseases of the Throat and Nose—Dr. JOHN MACINTYRE.

Diseases of the Skin—Dr. GEORGE MCINTYRE.

Special advice is given to Out-Patients on

Diseases of the Ear, by Dr. JAS ADAM, Dr. R. S. MCKIM and Dr. JOHN W. LEITCH.

Diseases of the Throat & Nose, by Dr. ROBT. FULLERTON and Dr. P. N. GRANT.

Diseases of the Skin, by Dr. GEORGE MCINTYRE.

Diseases of Women, by Dr. JAMES TAYLOR, Dr. A. LOUISE MCILROY, Dr. JAS. HENDRY, and Dr. JOHN MCINTYRE.

Venereal Diseases, by Dr. DAVID WATSON.

Diseases of the Teeth, by Mr. WILLIAM TAYLOR and Mr. W. R. TAYLOR.

Consulting Surgeon for Diseases of the Eye—Dr. A. MAITLAND RAMSAY.

Consulting Medical Electrician—Dr. JOHN MACINTYRE.

Medical Electrician—Dr. JAMES R. RIDDELL.

Assistant Medical Electricians—Dr. SAMUEL CAPIE, Dr. KATHERINE CHAPMAN, Dr. J. GIBSON GRAHAM, and Dr. A. M. KENNEDY.

Vaccinator—Dr. H. H. BORLAND.

Anæsthetists—Dr. JOHN DONALD, Dr. H. P. FAIRLIE, Dr. F. L. NAPIER, Dr. A. S. RICHMOND, Dr. WILLIAM LAIRD and Dr. ELLEN BROWN ORR.

Pathologist—Dr. JOHN H. TEACHER.

Assistant Pathologists—Dr. J. A. G. BURTON, Dr. JAMES HENDRY, Dr. NORA M. A. ALLAN, and Dr. MARY BROWN.

Bacteriologist—Vacant. *Assistant Bacteriologist*—Dr. J. A. CAMPBELL.

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Assistant Surgeons—Dr. JOHN ROWAN, Dr. H. W. THOMSON, Dr. JOHN GILCHRIST, Dr. JOHN PEARSON, Dr. J. A. PEARSON, Dr. ROSS MUIR, and Dr. W. R. KEEP.

Electrician—Dr. JOHN GILCHRIST. *Pathologist*—Dr. JOHN H. TEACHER.

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Assistant Surgeons: Mr. Slattery, Mr. Crawford.
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Ophthalmic Surgeon: Mr. Joyce. **Gynæcologist**: Dr. Gibson.
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. . THE . .

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TRAINED MALE NURSES, £2 10s. *to* £3 3s. weekly.
TRAINED FEMALE NURSES, £2 2s. *to* £3 3s. weekly.

Apply MATRON, Retreat, York.
Nat. Tel. 112.

New Saughton Hall, — POLTON, — MIDLOTHIAN.

PRIVATE HOSPITAL for the Treatment of NERVOUS & MENTAL CASES.

NEW SAUGHTON HALL, which takes the place of Saughton Hall, established in 1798, is situated seven miles south of Edinburgh, in the beautiful neighbourhood of Hawthornden, and Rosslyn, and is surrounded by picturesque and well-timbered pleasure grounds extending to 125 acres. There is also a **SEASIDE HOUSE** at **GULLANE, EAST LOTHIAN.**

RAILWAY STATIONS.—Polton five minutes; and Loanhead, ten minutes' walk from the Institution—reached in half-an-hour from the Waverley Station, Edinburgh. *Telephone:* **4** *Loanhead.*

Forms of Admission for Voluntary or Certified Cases, full instructions, etc., can be obtained on application to the Resident Medical Superintendent, **J. BATTY TUKE, M.D., F.R.C.P. Ed.**

Inclusive Terms from £84 to £400 per annum, according to requirements.

BETHEL HOSPITAL

FOR MENTAL DISEASES,

NORWICH.

ESTABLISHED A.D. 1713.

THIS Institution is an endowed Hospital, registered under the Lunacy Acts, and managed by a Board of Governors who have no pecuniary interest in its success, but whose sole object is to promote the comfort and well-being of the Patients. The Hospital is arranged for both sexes.

The terms for admission are thirty shillings per week, or more, according to Patients' condition and circumstances, which includes everything, except clothing, carriage exercise, or any expenses incurred for amusement beyond the Hospital grounds.

CONSULTING PHYSICIAN:
SAMUEL J. BARTON, M.D.
(Senior Physician to the Norfolk and Norwich Hospital).

RESIDENT MEDICAL SUPERINTENDENT:
SAVILLE J. FIELDING, M.B.

CLERK TO THE GOVERNORS:
FRANCIS HORNOR, QUEEN STREET, NORWICH.

MATRON:
MISS OXLEY *(Late Sister Guy's Hospital, London).*

APPLICATION FOR ADMISSION TO BE MADE TO THE

Resident Medical Superintendent, BETHEL HOSPITAL, NORWICH.

58

SPRINGFIELD HOUSE

NEAR BEDFORD.

(TELEPHONE No. 17. **Within an hour of London by Midland.**)

AN INSTITUTION FOR THE

CARE AND CURE OF THE INSANE.

Under the Personal Direction of the Licensees:

DAVID BOWER, M.D.

(Late Resident Medical Superintendent of Saughton Hall Asylum, Edinburgh;)

MR. W. S. BOWER AND MISS BELLARS,

(ASSISTED BY LADIES' AND GENTLEMEN'S COMPANIONS.)

DR. BOWER attends at 5, Duchess Street, Portland Place, W., on Tuesdays, from 4 to 5.

Ordinary Terms = Three Guineas per week.
Including separate bedrooms for all suitable cases.

Vacancies are advertised each week in the *British Medical Journal* and the *Lancet.*

City of London Mental Hospital,

Under the management of a Committee of the Corporation of the City of London. ✲ **Near DARTFORD, KENT.**

Private Patients are received at the inclusive rate of One Guinea per week and upwards. An illustrated booklet giving full particulars can be obtained from the Medical Superintendent. The institution is within two miles of Dartford Station on the S. E. Railway, and is about 16 miles from London.

The Lawn, Lincoln.

A REGISTERED HOSPITAL FOR MENTAL DISEASES,
situated in the City of Lincoln, near to the Cathedral.

FOR TERMS, APPLY TO
DR. RUSSELL, *Resident Medical Superintendent.*

BOOTHAM PARK, YORK.

A REGISTERED MENTAL HOSPITAL
for the Treatment and Care of Nervous and Mental
—— Invalids of the Upper and Middle Classes ——

For Particulars apply to the Medical Superintendent—
GEORGE RUTHERFORD JEFFREY, M.D. Glasg., F.R.C.P.E., F.R.S.E.

Telegrams: "ENVOY, FINSQUARE, LONDON." Telephone: 5608 Central.

ST. LUKE'S HOSPITAL

For Mental Diseases,

ESTABLISHED 1751. ⚜ **OLD STREET, LONDON.**

ADMISSION on payments up to 42/- per week. In certain circumstances Patients are received gratuitously.

Convalescent Establishment at **St. Lawrence-on-Sea, Thanet.**

Country Convalescent Establishment, near Gerrards Cross, Bucks, standing in 130 acres of Park, Ornamental Gardens, and Grounds. ::

:: VOLUNTARY BOARDERS ARE RECEIVED AT THE HOSPITAL AND CONVALESCENT HOMES. ::

TRAINED NURSES supplied from the Private Nursing Staff for nursing Mental and Nervous cases at their own homes.

Full particulars on application to the Secretary at the Hospital. ⚜ **W. H. BAIRD, Secretary.**

Established 1826.

PECKHAM HOUSE

112, PECKHAM ROAD, LONDON, S.E.

Telegrams: "Alleviated, London." **Telephone: 1576 Hop.**

An Institution licensed for the CARE and TREATMENT of the MENTALLY AFFLICTED of Both Sexes. Conveniently situated. Electric trams and omnibuses from the Bridges and West-End pass the House. Private houses with electric light for suitable cases adjoining the Institution. Holiday parties sent to the Seaside branch at Worthing during Summer months.

— Moderate Terms:—

Apply to MEDICAL SUPERINTENDENT for further particulars.

FIDDINGTON HOUSE,

MARKET LAVINGTON, WILTS.

Telephone: **Lavington 11.** *Telegrams:* **"Benson, Market Lavington."**

THIS Old-established Home for the Care and Treatment of **LADIES and GENTLEMEN MENTALLY AFFLICTED** is pleasantly and healthily situated, and stands in over 15 acres of Pleasure Grounds, Gardens, &c. Every indoor and outdoor amusement provided for the Patients, including Billiards, Cycling, and Carriage and Motor Exercise. Voluntary Boarders received without Certificates. *Railway Stations*—Lavington, G.W.R., 1½ miles; Devizes, G.W.R., 6 miles. 1¼ hours from London.

For Terms, etc., apply to J. R. BENSON, F.R.C.S. Eng., Proprietor.

BETHLEM ROYAL HOSPITAL,

LAMBETH ROAD, LONDON, S.E.

LADIES AND GENTLEMEN of the Educated Classes suffering from NERVOUS OR MENTAL DISORDERS of short duration, are received for treatment at a fixed fee of **2 guineas** a week. Voluntary Boarders are also received.

Physician Supt.: DR. J. G. PORTER PHILLIPS, M.R.C.P.

To whom all applications should be addressed.

CONVALESCENT HOME at WITLEY, SURREY.

The PLEASAUNCE, YORK.

Telephone: 184 York. **Old Established MENTAL HOME for LADIES.**

Licensed for 22 Ladies of the Upper & Middle Classes. The House stands in extensive well-wooded grounds within the boundary of the city.

A special feature is made of the Treatment of Incipient Mental Cases, Certified or Voluntary.

Terms and Prospectus on application to Resident Licensees, **Leonard D. H. Baugh, M.B.; (Mrs.) Janie S. Baugh, M.B.**

CAMBERWELL HOUSE,

33 PECKHAM ROAD, S.E.

Telegrams: "PSYCHOLIA, LONDON." Telephone: New Cross 1057.

For the Treatment of MENTAL DISORDERS.

Completely detached Villas for Mild Cases. Voluntary Boarders received. 20 acres of grounds. Private Chapel (daily service held by Chaplain). Cricket, tennis, croquet, squash racquets, bowls, and all indoor amusements. ORDINARY TERMS, **2 guineas** a week.

Full Particulars from the SECRETARY.

Senior Physician: FRANCIS H. EDWARDS, M.D., M.R.C.P.

HOVE VILLA, BRIGHTON—A Convalescent Branch of the above.

Incorporated by Royal Charter.

JAMES MURRAY'S ROYAL ASYLUM, PERTH.

Chairman—**The Rt. Hon. The Earl of Mansfield.**

THIS MENTAL HOSPITAL, FOR PRIVATE PATIENTS ONLY, is beautifully situated in the immediate vicinity of Perth, in the midst of extensive Pleasure Grounds, which are surrounded by the fields of the Home Farm.

The Main Building has been entirely re-organized and enlarged by the addition of *two wings*, for the reception of acute cases, so as to render it an efficient *Hospital* as well as a comfortable *Home*.

The Mansion-House of PITCULLEN, which is quite separate from the Asylum, and THE EAST AND WEST VILLAS, afford the necessary variety of accommodation for modern treatment. SEVEN GABLES, ELIE, the seaside house, is arranged for the reception of those suffering from mild mental disturbance, and for convalescents.

Physician Superintendent: Dr. DODS BROWN.
Consulting Physician: Dr. URQUHART.

Telephone No.: 104 Perth.

ASHWOOD HOUSE,

KINGSWINFORD, STAFFORDSHIRE.

An old-established and modernized Institution for the Medical Treatment of Ladies and Gentlemen Mentally Afflicted.

THE House, pleasantly situated, stands in picturesque grounds of forty acres in extent, with a surrounding country noted for the beauty of its walks and drives. The climate is genial and bracing. Occupation, indoor and outdoor amusements, and carriage and other exercise amply provided.

TERMS vary according to requirements as to accommodation, special attendance, etc.

TELEPHONE, 19, KINGSWINFORD.

Railway Stations: Stourbridge Junction (G.W.R.), 3½ miles; Dudley (L. & N.W.R.), 4 miles; Wolverhampton (G.W.R. or L. & N.W.R.), 7 miles. Intending visitors can be met at any of these Stations.

FOR FURTHER PARTICULARS APPLY TO THE MEDICAL SUPERINTENDENT.

NORTHWOODS HOUSE,

WINTERBOURNE, near BRISTOL.

A Sanatorium for Ladies and Gentlemen suffering from Nervous and Mental Disorders.

SITUATED in a large Park, 300 feet above sea level, in a healthy and picturesque locality, easily accessible from London, Bristol, and Cardiff by Winterbourne Station; or from Fishponds, Yate, or Patchway Stations.

Voluntary Boarders received without Certificates.

For further information, see London Medical Directory, p. 1891, and for Terms, etc., apply to Dr. J. D. THOMAS, Resident Medical Proprietor, Northwoods House.

Dr. THOMAS *attends at* 64, *PARK STREET, BRISTOL, on Mondays and Thursdays, from* 12 *to* 1.30 *o'clock.*

TELEPHONE No. 18 WINTERBOURNE.

BARNWOOD HOUSE,
GLOUCESTER.

A REGISTERED HOSPITAL for PRIVATE PATIENTS Only, of the UPPER and MIDDLE CLASSES.

ARRANGED and furnished with all the most approved appliances for the treatment, comfort, and amusement of the Inmates. Within two miles of the Railway Station, and easily accessible by Rail from London and all parts of the kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of 250 acres.

For Terms, etc., apply to **JAS. GREIG SOUTAR, M.B., C.M.,**
TELEPHONE No. 307. *Resident Superintendent.*

PLYMPTON HOUSE,
PLYMPTON, SOUTH DEVON
ESTABLISHED 1834.

PLYMPTON HOUSE is licensed for the accommodation of both sexes, and is well adapted by its position and appointments for the **Medical Treatment and Care of Patients of the Upper and Middle Classes, suffering from MENTAL DISEASE.**

The proprietors, Dr. ALFRED TURNER and Dr. J. C. NIXON, have had very large experience of Mental cases, both in public and private institutions, and everything that can be done to ameliorate the condition of the chronic, and promote the cure of the acute cases—placed under their charge—is guaranteed.

TERMS ON APPLICATION. *Letters and Telegrams:*
Telephone: No. 2 PLYMPTON. DR. TURNER, PLYMPTON.

OTTO HOUSE,
47, North End Road, WEST KENSINGTON, W.
Telephone: **No. 1004 Hammersmith.**

A HOME FOR THE CARE AND TREATMENT OF LADIES MENTALLY AFFLICTED.

Apply to Mrs. CHAPMAN (Resident Lady Superintendent), *or to*
A. H. SUTHERLAND (Licensed Propr.), 2a Marloes Road, KENSINGTON, W.

"NORMANSFIELD."

A PRIVATE ESTABLISHMENT for the care and training of the **MENTALLY DEFICIENT.**

Patients of either sex, including quite young children, received. Separate houses for the slighter grades of defect.

For particulars apply to the Resident Physician and Proprietor, HAMPTON WICK.

THE WARNEFORD,

HEADINGTON HILL, OXFORD.

A Registered Hospital for the Care and Treatment of both Sexes of the Upper and Middle Classes, when suffering from Nervous and Mental Disorders.

President—THE RIGHT HON. THE EARL OF JERSEY.

Chairman of the Committee—
THE REV. WILLIAM ARCHIBALD SPOONER, D.D., Warden of New College, Oxford.
Vice-Chairman—SURGEON-GENERAL SIR A. FREDERICK BRADSHAW, M.A., K.C.B.

The Regular Charge for Patients is **£2 2s.** a week, but the Committee have power to alter the charges at their discretion, as the circumstances of cases require.

The building is arranged, so far as is compatible with the requirements of a Mental Hospital, in the manner of an ordinary private residence.

The Hospital possesses an Endowment Fund, arising from numerous grants of the late Dr. SAMUEL WILSON WARNEFORD and others. When a reduction of the ordinary charge is asked, a special statement of the circumstances of the Patient must accompany the application for Admission.

For further particulars, apply to the Medical Superintendent, ALEX. W. NEILL, M.D.

THE GRANGE, Near ROTHERHAM,

A SANATORIUM OF THE HIGHEST CLASS FOR THE

CARE & CURE OF MENTAL INVALIDS (LADIES).

Consulting Physician: CROCHLEY CLAPHAM, M.D., F.R.C.P.E.
Resident Physician: G. E. MOULD, M.R.C.S. Eng., L.R.C.P. Lond.
Physician for Mental Diseases to the Sheffield Royal Hospital.

THE House is a spacious Family Mansion, with extensive pleasure grounds, including good Croquet and Tennis Grounds, and an immense Park, containing Private Drives and Walks of several miles in extent. It is situated in the heart of the famous Robin Hood Country (5 miles from Sheffield, 4 from Rotherham) and is surrounded by beautiful scenery, and an atmosphere free from smoke and impurity. Situation dry and healthy. The arrangements are of a domestic character. The Proprietors welcome visits from the usual Medical Attendant of the Patient during her residence. Under the New Act Voluntary Patients can be received, without Certificates, on own personal application. The Rev. R. T. C. SLADE, Mus. Bac., Vicar of Thorpe-Hesley, acts as Chaplain, and conducts regular Services.

The Resident Physician may be seen at the Grange; or at Leavygreave House, Hounsfield Road, Sheffield, by appointment. **(Nat. Tel. No. 34, Rotherham.)**

GRANGE LANE STATION (M. S. & L. Railway) is within a quarter of a mile of The Grange, and may be reached via Sheffield or Barnsley direct; or via Rotherham, changing at Tinsley.

FOR TERMS, FORMS, &C., APPLY TO THE RESIDENT PHYSICIAN.

CLARENCE LODGE,

CLARENCE ROAD, CLAPHAM PARK.

A LIMITED number of **LADIES** suffering from **MENTAL** and **NERVOUS DISORDERS** are received for treatment under a Specialist. The House stands in large grounds.

For further Particulars see Illustrated Prospectus from the Proprietress,
Telephone: 494 Brixton. **MRS. THWAITES.**

CORPORATION MENTAL HOSPITAL

PORTSMOUTH.

ACCOMMODATION is provided for LADIES and GENTLEMEN in Two Detached Villas, very pleasantly situated, at a charge from **£1 11s. 6d.** upwards, including all necessaries except clothing.

APPLY .. .. MEDICAL SUPERINTENDENT.

MIDDLETON HALL,

MIDDLETON ST. GEORGE, near DARLINGTON, Co. DURHAM.

PRIVATE ASYLUM FOR THE CARE AND TREATMENT OF LADIES AND GENTLEMEN.

THE HOUSE, which stands amid well-wooded grounds, in a healthy and pleasant country in the valley of the Tees, has been recently erected from plans approved by the Commissioners in Lunacy, and embodies all the latest improvements in the construction of Homes for the Nervous and Mentally Afflicted. The building is **fire-proof**, and lighted throughout by Electricity, and the heating is aided by a system of steam pipes. Private sitting-rooms and special attendants are provided if required. Voluntary Boarders, not under certificates, can be received.

Terms to be had on application to **L. HARRIS-LISTON, M.D., Medical Supt.**

IN CHARMING COUNTRY, NEAR LONDON.

Littleton Hall, Brentwood, Essex.

(400 FEET ABOVE SEA LEVEL).

A HOME for a few LADIES MENTALLY AFFLICTED. Large grounds. Villas. London 18 miles (easy motor run). Liverpool Street half-an-hour. Stations: Brentwood one mile; Shenfield one mile.

For Terms, particulars and forms of admission, etc., apply Dr. HAYNES. *Telephone and Telegraph*: Haynes, Brentwood 45.

THE COPPICE,

NOTTINGHAM.

HOSPITAL FOR MENTAL DISEASES.

***President*—The Right Hon. EARL MANVERS.**

This Institution, for the reception of **Private Patients** of both sexes of the **Upper and Middle Classes** only, at moderate rates of payment, is beautifully situated in its own grounds about two miles from Nottingham, and from its singularly healthy and pleasant position, and the comfort of its internal arrangements, affords every facility for the relief and cure of those mentally afflicted. Divine Service is held in the Institution every Sunday by the Chaplain, who also visits the Patients. Carriage exercise is provided.

For Terms, Etc., apply to

Dr. HUNTER, *Physician-Superintendent.*

COTON HILL

MENTAL HOSPITAL.

NEAR STAFFORD.

Chairman of the Committee of Management—

THE RIGHT HONOURABLE THE EARL OF DARTMOUTH.

THIS HOSPITAL, which is beautifully situated in a high and healthy position, with extensive grounds, Cricket Field, Lawn Tennis Courts, Golf Links, etc., is devoted to the CARE AND TREATMENT OF THE MENTALLY AFFLICTED OF THE UPPER AND MIDDLE CLASSES.

PRIVATE ROOMS with Special Attendants in the Hospital, or semi-detached Villas in the grounds can be arranged. **Terms on application.**

For further particulars apply to R. W. HEWSON, L.R.C.P. & S. Ed. (Ed. Univ.) Med. Supt.

PRIVATE ASYLUMS.
CO. DUBLIN.

HAMPSTEAD, Glasnevin, for Gentlemen | HIGHFIELD, Drumcondra, for Ladies.

For the Cure and Care of Patients of the Upper Class suffering from Mental and Nervous Diseases and the Abuse of Drugs.

Telephone No. 1032. Telegrams: "Eustace," Glasnevin.

These Hospitals are built on the Villa System, and there are also Cottages on the demesne (154 acres), which is 150 ft. above the sea level and commands an extensive view of the Dublin Mountains and Bay.

Voluntary Patients admitted without Medical Certificates.

For further information apply for illustrated prospectus, etc., to the Resident Medical Superintendents: Dr. Henry Marcus Eustace, Highfield, Drumcondra, or Dr. William Nielson Eustace, Hampstead, Glasnevin; or at the Office, 41, Grafton Street, Dublin. Telephone 198. On Mondays, Wednesdays and Fridays, at 2.30 p m.

ESTABLISHED 1824.

The Retreat Private Asylum,
NEAR ARMAGH.

For the CURE and TREATMENT of Ladies and Gentlemen of the Upper and Middle Classes suffering from

MENTAL AND NERVOUS DISEASES.

Voluntary Boarders and Inebriates admitted without Medical Certificates.

This Retreat is beautifully situated in picturesque grounds of 150 acres, and Patients enjoy the greatest possible liberty. There is a large percentage of Recoveries on recent admissions.

For particulars apply to the Resident Medical Superintendent, Dr. J. GOWER ALLEN, J.P.

FARNHAM HOUSE FOR GENTLEMEN | MARYVILLE FOR LADIES
FINGLAS, NEAR DUBLIN.

Private Hospitals for Patients of the Upper Classes suffering from NERVOUS and MENTAL DISEASES, ALCOHOLISM, Etc.

Telephone—Dublin 1470
Telegrams—"Finglas."

THESE Establishments, which are healthily situated in pretty grounds, upwards of 59 acres in extent, provide modern medical curative and palliative treatment on moderate terms. Voluntary Boarders admitted without Certificates. Large Staff maintained. Up-to-date sanitation.

A SEPARATE WING has been set apart for the **Treatment of ALCOHOLISM and DRUG HABITS,** with their own reception rooms and grounds.

Prospectus and Terms on application to—
H. P. D'ARCY BENSON, M.D., M.R.C.P., F.R.C.S. (Edin.), Resident Medical Supt., Farnham House, FINGLAS, DUBLIN.

DERBY MENTAL HOSPITAL.

ALBANY HOUSE, a Detached Block for FEMALE PRIVATE PATIENTS.

Terms: ONE GUINEA PER WEEK, which includes everything except clothing. This Villa is distinct from the main building, and has separate recreation grounds.

For further particulars, apply to the Medical Superintendent,

Dr. S. R. MACPHAIL, Rowditch, DERBY.

STOKE PARK COLONY

For Mentally Defective Children,
STAPLETON,
BRISTOL.

Apply to Secretary— **The Incorporation of National Institutions for Persons requiring Care and Control, 14 Howick Place, Westminster, S.W.**

Telephone: **3045, Victoria.** *Telegrams:* **"Burdensome, London."**

THE ROYAL ALBERT INSTITUTION

LANCASTER.

The ROYAL ALBERT INSTITUTION is a Home for the Care, Education and Training of the IMPROVABLE FEEBLE-MINDED, with accommodation for 750 cases.

Terms: 1. FREE PATIENTS, between the ages of Six and Fifteen, whose friends cannot meet the lowest payment of 25 Guineas per annum.

2. PAYING PATIENTS **admitted by the Central Committee without Election and at any time.** The charges vary from 25 to 200 Guineas per annum.

BRUNTON HOUSE (For Private Pupils).

BRUNTON HOUSE combines the comforts of a Private Home with all the advantages of a large Public Institution under responsible management. It possesses extensive gardens and grounds which include tennis and croquet lawns. Individual attention is given to the pupils by an experienced Staff, under a Resident Physician and Lady Matron. SAMUEL KEIR, *General Secretary.*

TUE BROOK VILLA,

LIVERPOOL, E.

PRIVATE ASYLUM for the **Care and treatment of Ladies and Gentlemen MENTALLY AFFLICTED.** Voluntary Boarders also received without certificates.

For terms apply to: **J. J. TISDALL, L.R.C.P. & S.** *or* **F. E. INGALL, F.R.C.S. Eng.** *Resident Medical Superintendents.*

HERRISON,

DORCHESTER ASYLUM.

This **Home for Private Patients** is delightfully situated, with all modern conveniences for the treatment of the Insane. Terms on application to the MEDICAL SUPERINTENDENT, Herrison, Dorchester.

Telegrams: "HERRISON, CHARMINSTER."

The SILVER BIRCHES, Church Street, EPSOM.

This Home has been established over 60 years for the Care and Treatment of Ladies suffering from Mental Ailments.

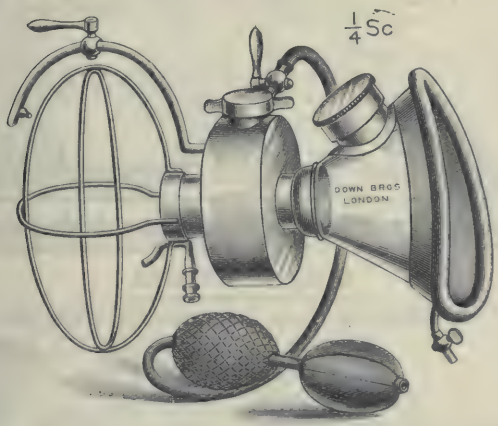
TERMS, Etc., on application to—

MISS M. O. DANIEL, *Res. Licensee*, or to Dr. E. C. DANIEL, *Co-Licensee.*

Telephone: 346 P.O. Epsom.

DOWN BROS.' SPECIALITIES.

THE
Anson and Caldwell-Smith
Open Ether Inhaler.



The following advantages are claimed for this apparatus :—

1.—It is a 'one hand' apparatus. No drop bottle is required.

2.—A regular supply of Ether is secured, under complete control by the Anæsthetist.

3.—The Patient's expirations do not pass over the gauze, and consequently waste of ether is avoided.

GRANDS PRIX :
PARIS 1900, BRUSSELS 1910, BUENOS AIRES 1910

GOLD MEDAL
ALLAHABAD 1910

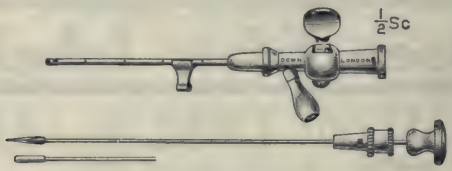
DOWN BROS. LTD.
Surgical Instrument Makers,
21 & 23 St. Thomas's St., London, S.E.
(OPPOSITE GUY'S HOSPITAL).

Telegrams: "DOWN, LONDON."
Telephones: Hop. 4400 (4 lines)

DOWN BROS.' SPECIALITIES.

A New Trocar with Cannula and Blunt Pilot for inducing Artificial Pneumothorax.

Suggested by Dr. CLIVE RIVIERE, Queen Anne Street, London, W.

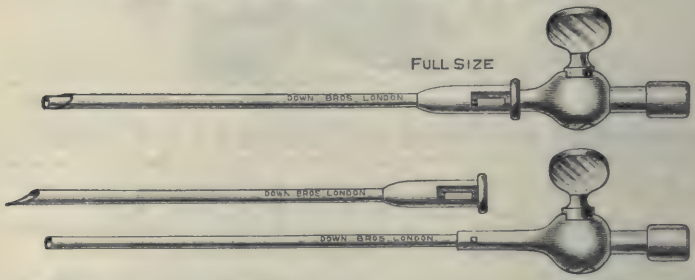


Securing the following advantages:—

1.—The risk of air-embolism is obviated.
2.—The depth of penetration is controlled by a stop.
3.—There is no risk of wounding the lung.

A Retractile Pointed Stopcock Cannula for Intravenous and Intraperitoneal Saline Infusion without Incision.

Suggested by Lieut.-Col. ROGERS, C.I.E., etc.



Affording a means of Intravenous, Intraperitoneal, and Subcutaneous Infusion, by simple puncture through the skin in cases where it is desirable to avoid preliminary opening of a vein and tying-in cannula.

Immediately on entering the vein, the sharp outer sheath can be retracted and secured out of the way, leaving the exposed blunt cannula in the vessel, and allowing large quantities of saline to be given with safety.

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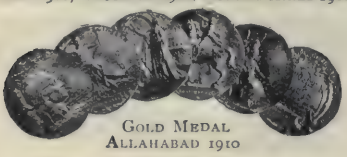
PARIS 1900, BRUSSELS 1910, BUENOS AIRES 1910.



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Surgical Instrument Makers,
21 & 23 St. Thomas's St., London, S.E.
(OPPOSITE GUY'S HOSPITAL).

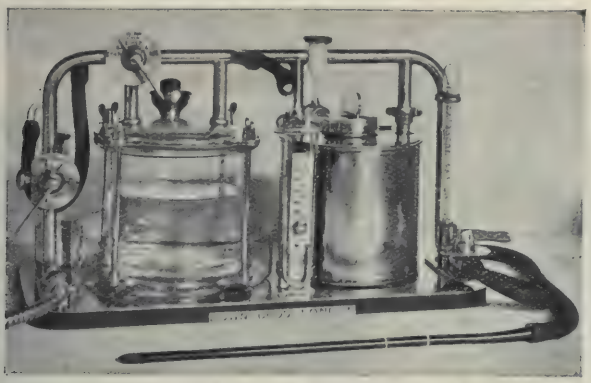
Telegrams: "DOWN, LONDON."
Telephones: Hop. 4400 (4 lines)

DOWN BROS.' SPECIALITIES.

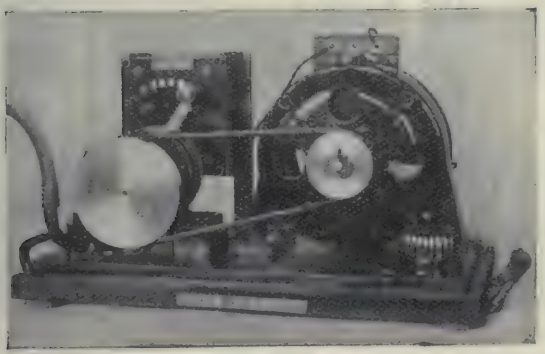
KELLY'S

Ether Insufflation Anæsthesia Apparatus.

New Model with Non-cooling Ether Chamber.



Etherization Apparatus.



Rotary Blower with Electric Motor.

For description of this apparatus in use by the nasal route for children, see the *Lancet*, July 18th, 1914.

GRANDS PRIX:
PARIS 1900, BRUSSELS 1910, BUENOS AIRES 1910.

GOLD MEDAL
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Manufacturers of Surgical Instruments & Aseptic Hospital Furniture.

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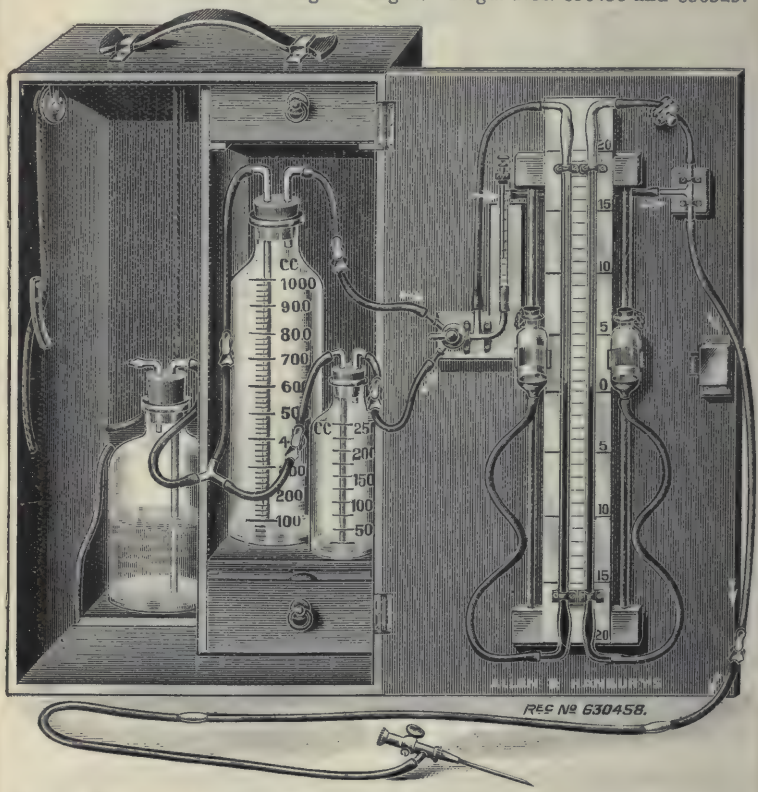
A. & H.'s Regd. Designs. Regd. Nos. 630458 and 630325.



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Full particulars on application.

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The use of this Instrument ensures practically a Bloodless Operation.

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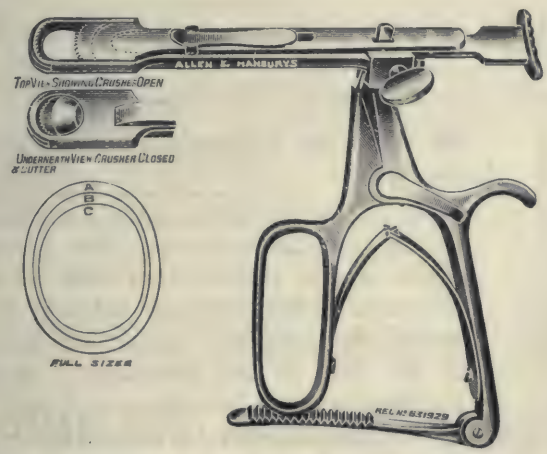

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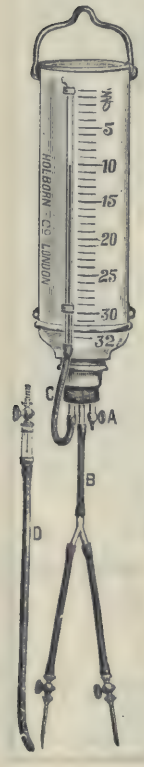

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Germs are all destroyed in less than half an hour. All that is necessary is to pour in requisite amount of water, place in dressings, adjust lid, and set on gas-ring, fire, or other heating apparatus.

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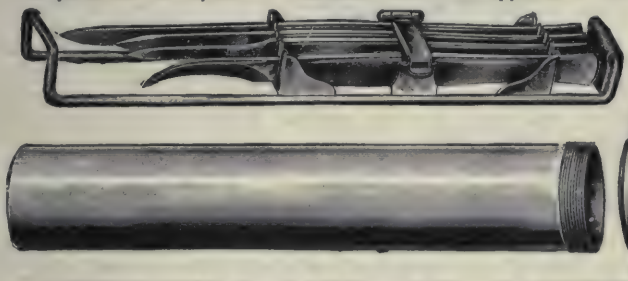

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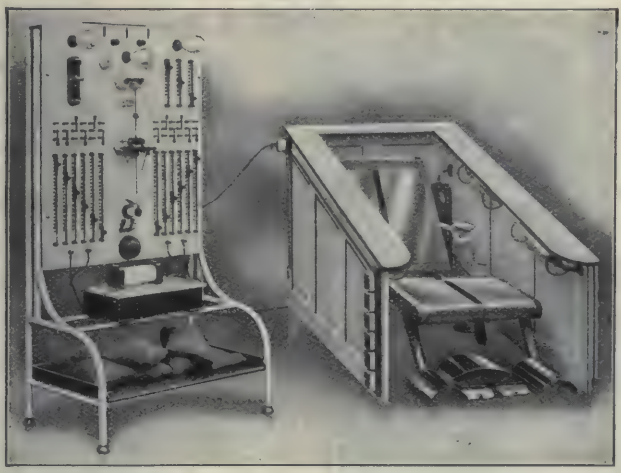

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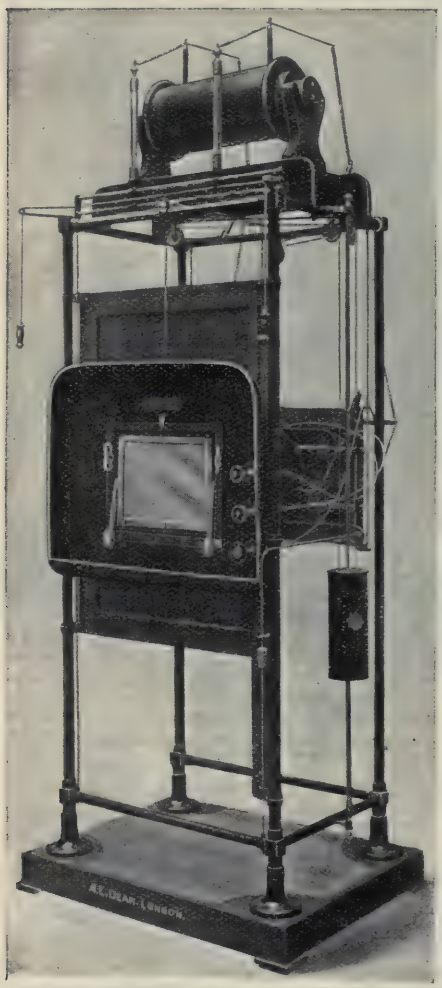
MODEL 1913.



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More than One Hundred of these Diascopes have been supplied to County Councils, Education Committees, Local Authorities and General Hospitals.

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Or, with the Secondary Microscope in oak case (*No.* 775), as *Fig.* 9

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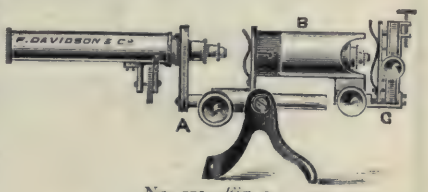

No. 775- *Fig.* 9.

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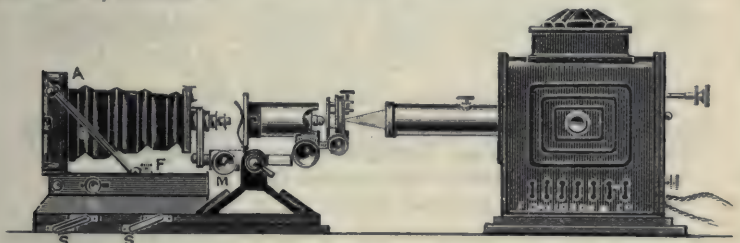

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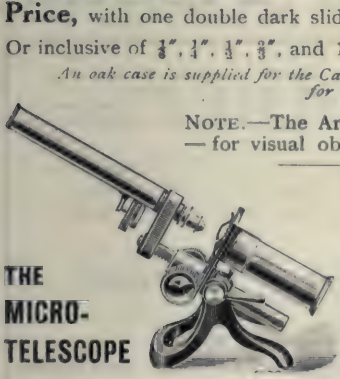

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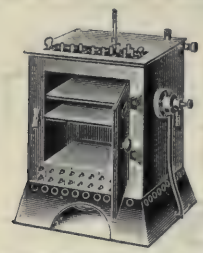

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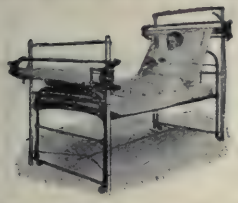


Sits patient up, changes its Sheet.

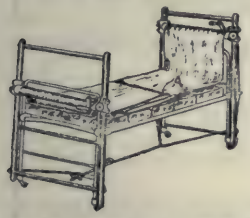
USED BY THE BRITISH RED CROSS SOCIETY.

Lifts Sacrum for Changing Draw Sheet.

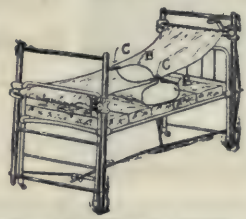
Lifts for Making Bed Underneath.

CAN BE HIRED.

THE LAMINECTOMY LIFTER.



Fold the sheet as at A. Fasten the clamps C C. Turn the handles and the sheet assumes the shapes B P, the patient only having to lie still.

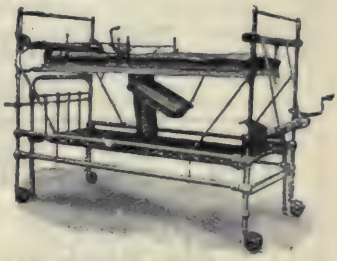


Wheels from Bed to Bed

THE SKEFFINGTON LIFTING CUSHION for BEDPAN or "X" RAYS.

USED BY THE WAR OFFICE.

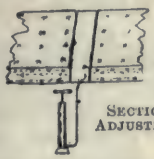
Lifts for Bed Pan in a Wide Bed as easily as in a Narrow One.



Lifts Patient and gives access to Spine.

THE SKEFFINGTON FRACTURE MATTRESS.

SECTION COLLAPSED.



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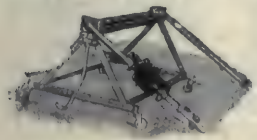
Slips on to any bedstead. Adopted by the London Hospital.

THE SKEFFINGTON SACRUM LIFTER



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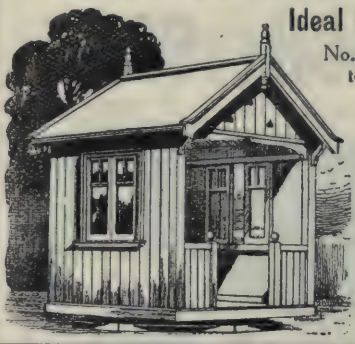

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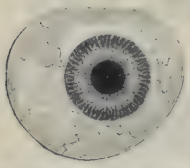

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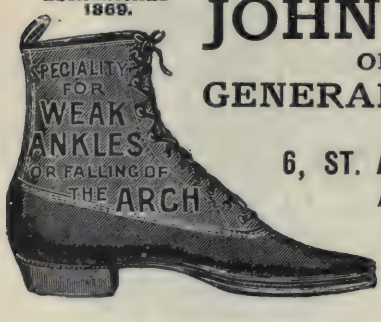

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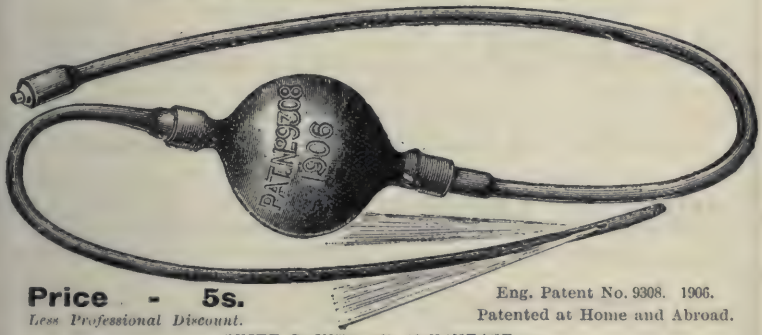

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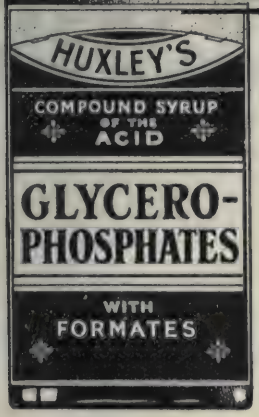

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